

From: [Campbell, Laura](#)
To: [mi-waterstrategy](#)
Subject: OGL Draft Water Strategy Comments
Date: Tuesday, August 25, 2015 5:05:21 PM
Attachments: [MFB Comments on OGL Water Strategy.pdf](#)
[Draft Water Strategy and Appendices Laura Campbell comments.pdf](#)

Attached please find Michigan Farm Bureau's comments on the Office of the Great Lakes' draft Water Strategy, along with the attachment referenced in our comments reflecting earlier red-line strikeout comments on the original Strategy draft. Please feel free to contact me with any questions.

Thank you,

Laura A. Campbell
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August 24, 2015

Ms. Emily Finnell
DEQ Office of the Great Lakes
P.O. Box 30473-7973
Lansing, Michigan 48909

Sent via email to: Mi-waterstrategy@michigan.gov

Re: Public Comment on *Sustaining Michigan Water Heritage, A Strategy for the Next Generation*

Dear Ms. Finnell,

Thank you for the opportunity to provide comments on the Office of the Great Lakes' draft *Sustaining Michigan Water Heritage, A Strategy for the Next Generation*. Michigan Farm Bureau is our state's largest general farm organization with more than 46,500 members, all of whom care about and depend on the vital water resources Michigan provides. Farmers in Michigan are not only significant water users in the state, but we also depend upon high water quality for agricultural and recreational use, and upon a robust infrastructure to support both rural water management and shipping. We appreciated being part of the Cabinet organized by Director Allan to assist in identifying some of the goals and outcomes that appear in this draft *Strategy*.

We found the process of gathering public input and publishing the *Strategy* draft to be well thought out and inclusive. In particular, the original draft of the *Strategy* offered to the Cabinet for review and suggestions provided us an extensive opportunity to share our thoughts and suggestions on the draft's message and language. That original document with our suggestions is attached for your convenience. Please allow these comments to serve as a supplement to our earlier suggestions.

In an effort to aid staff reviewing public comments on the draft *Strategy*, we offer the following comments in the order in which they appear in the main body of the document, with references to Table 1, the Water Strategy Priority Recommendations and Measures of Success, and Table 2, the Water Strategy Implementation Plan.

Chapter 1: Protect and Restore Aquatic Ecosystems

We support the majority of the recommendations in this chapter, and agree that collaborative engagement at the individual, local, state, and regional level is the most effective way to improve water quality and restore aquatic ecosystems. However, we cannot support the last recommendation under this chapter (page 18), which addresses improving water management in rural landscapes:

Eliminate impairments in priority watersheds that have degraded water quality and/or aquatic ecosystems due to nutrient runoff and soil erosion. Engage landowners through a collaborative and adaptive community-based natural resource management process to identify local actions to change behaviors and solutions to achieve those outcomes. Failure to achieve demonstrable outcomes within established timeframes could trigger additional measures.

The sentence identifying measures triggered by failure to achieve demonstrable outcomes does not comport with the language throughout this chapter of engagement and collaboration. In fact, it does not even acknowledge that water quality impairment can be complex and can be caused by a range of sources, or that improving water quality may require different technologies or practices in different areas and under different land uses. Instead it appears to bring a regulatory or mandated structure into what is otherwise a very broad topic that attempts to address everything from agricultural soil management and drainage to irrigation and conservation easements. Further, Table 2 (pages 60-61) identifies the implementation metric for this recommendation as developing statewide land use activity performance standards and requiring agricultural land uses to follow the standards of the Michigan Agriculture Environmental Assurance Program (MAEAP).

Such mandates for land use standards violate private property rights, and do not follow provisions of the Clean Water Act identifying a separation of standards between point and nonpoint sources of discharge into regulated waters, or provisions of NREPA designating obligations to maintain water quality. In its current form, this recommendation instead purports to dictate land use, soil management practices, drainage, and other methods in ways that may not fit all landscapes, and which may not address priority resource concerns. This goal can be accomplished through continuing the chapter's emphasis on education and engagement of landowners rather than heavy-handed regulatory action. The recommendation's reliance on mandating MAEAP standards further places burdens on landowners through what is explicitly identified in statute as a voluntary program, and which should remain a voluntary program to incentivize environmental stewardship rather than punish landowners who may be unable to comply with all its many high standards.

We urge the Office of the Great Lakes to remove the last sentence of this recommendation. In Table 2, we further urge the Office of the Great Lakes to amend its implementation metric to replace "performance standards" with "best management practices," to encourage rather than

mandate agricultural land use following MAEAP standards, and to eliminate the language to develop escalated “additional actions” triggered by watershed impairment.

Chapter 2: Ensure Clean and Safe Water

We agree with all of the recommendations in this chapter. We do urge the Office of the Great Lakes however, to review the introduction to this chapter (page 21), which states:

In many areas of the state, nitrate contamination is a concern. In Michigan, the U.S. Geological Survey regards nitrate-N levels of more than 2 milligrams/liter in water as a sign that human-related nitrate sources have adversely affected the water. In rural areas, elevated levels of nitrate can be associated with animal manure and agricultural fertilizers. Septic systems can also serve as a source of nitrate contamination, though that risk is minor if the systems are designed and maintained for nitrogen removal and water wells are properly sited, constructed and maintained.

This paragraph, in contrast to the description of “minor” risk of nitrate pollution from properly maintained septic systems which are the subject of a majority of the recommendations, nitrate pollution is described as inevitably associated with manure and fertilizer. Proper management of manure and agricultural fertilizers can also minimize the risk of nitrate pollution. We urge the Office of the Great Lakes to add the following: “In rural areas, elevated levels of nitrate can be associated with animal manure and agricultural fertilizers *unless they are properly managed.*”

Chapter 5: Promote Water-Based Economies

We support the language and recommendations in this chapter identifying opportunities to conserve and reuse water and optimize efficiency of use. We also support the recognition of aquaculture as an important and growing industry that provides a safe and affordable food supply to a growing number of people. However, we object to this draft’s identification of specific types of aquaculture operation in this paragraph (page 38):

Aquaculture is another area that could thrive based on Michigan’s plentiful water supply and high water quality. In a world demanding ever-increasing amounts of high-quality fish and protein, growing the state’s aquaculture industry will require significant innovation in water technology. In particular, industry and the state should continue to support closed-loop or recirculating systems. Lowering energy costs of production, improving water filtration and strengthening supply chains for commercial aquaculture systems will enable the industry to grow substantially in an ecologically responsible fashion.

Safe and responsible aquaculture operations can take many forms and have the capacity to be managed within our state's water quality standards whether they are closed-loop systems, in-stream systems, or open-water pen systems. For the state to pick only certain types of operations as those worthy of support in a long-term strategy severely limits the aquaculture industry's development and demonstrates a bias against viable and current successfully operating systems. We urge the Office of the Great Lakes to amend the sentence in the above paragraph to: "Industry and the state should continue to support aquaculture development in ways that both build the industry and protect water quality."

We further object to the recommendation (page 39) which states:

Establish voluntary water efficiency targets for agriculture in areas of existing or potential water stress.

In Table 2 (page 66), the implementation metric for this recommendation states:

By 2017, develop a baseline for water usage, data collection and definitions to inform development of water conservation goals and objectives in areas of existing or potential water stress. Collect data for two years. Establish targets. Increase in the number of water stressed regions that have water efficiency plans and water efficiency targets by 2020.

Agriculture already has standards of efficiency which were developed through years of university research and stakeholder participation: the Generally Accepted Agriculture and Management Practices for Irrigation Water Use. These standards recognize that water use for irrigation (as well as water use for livestock) is vital to many varieties of agricultural products and directly impacts production quality and yield. The standards concentrate on maximizing efficiency of use – that is, reducing waste – rather than dictating volumes, in order to ensure that agricultural production is not hampered by arbitrary limits to water use applied industry-wide. Michigan Farm Bureau policy opposes water allocation that preempt riparian rights or limit agricultural use. Therefore, rather than create an entirely new set of standards or targets for the agricultural industry, we urge the Office of the Great Lakes to amend the above recommendation to say:

Establish voluntary targets for agriculture to comply with the Generally Accepted Agriculture and Management Practices for Irrigation Water Use, under Michigan's Right to Farm Law, Act 93 of 1981, in areas of existing or potential water stress.

We recommend the implementation metric be amended to say:

By 2017, establish targets to increase the percentage of agricultural producers complying with the Irrigation GAAMP in water stressed regions by 2020.

Chapter 7: Monitor Water Quality

We support all of the language and recommendations in this chapter. However, in Table 1 (page 8), the recommendation stating “Implement a pilot water resource decision framework” lists a measure of success as “Achieve a net stabilization of groundwater depth across the state.” This measure of success is, first, impossible to achieve as groundwater fluctuates due to innumerable causes which may not be related to impacts from withdrawals or other anthropogenic causes. Second, this measure is not supported by the language of the chapter, which discusses monitoring and mapping groundwater to ensure sustainable use – not to establish a static threshold standard. We recommend the Office of the Great Lakes amend the measure of success to say, “Achieve sufficient monitoring and mapping of groundwater flows to evaluate environmental impacts and understand the needs of sustainable use of groundwater resources.”

We are grateful for the opportunity to participate in the development of such an important part of Michigan’s resource management. We support movement forward and implementation of a long-term water strategy that will support the economic, ecological, social, and cultural value everyone in Michigan places upon water. Water is vital to all citizens, all industries, and to the identification of Michigan as the Great Lakes State. We look forward to continuing to work with the Office of the Great Lakes on the completion of this strategy, and to participating in implementation of goals all stakeholders can support. Please feel free to contact me with any questions.

Sincerely,



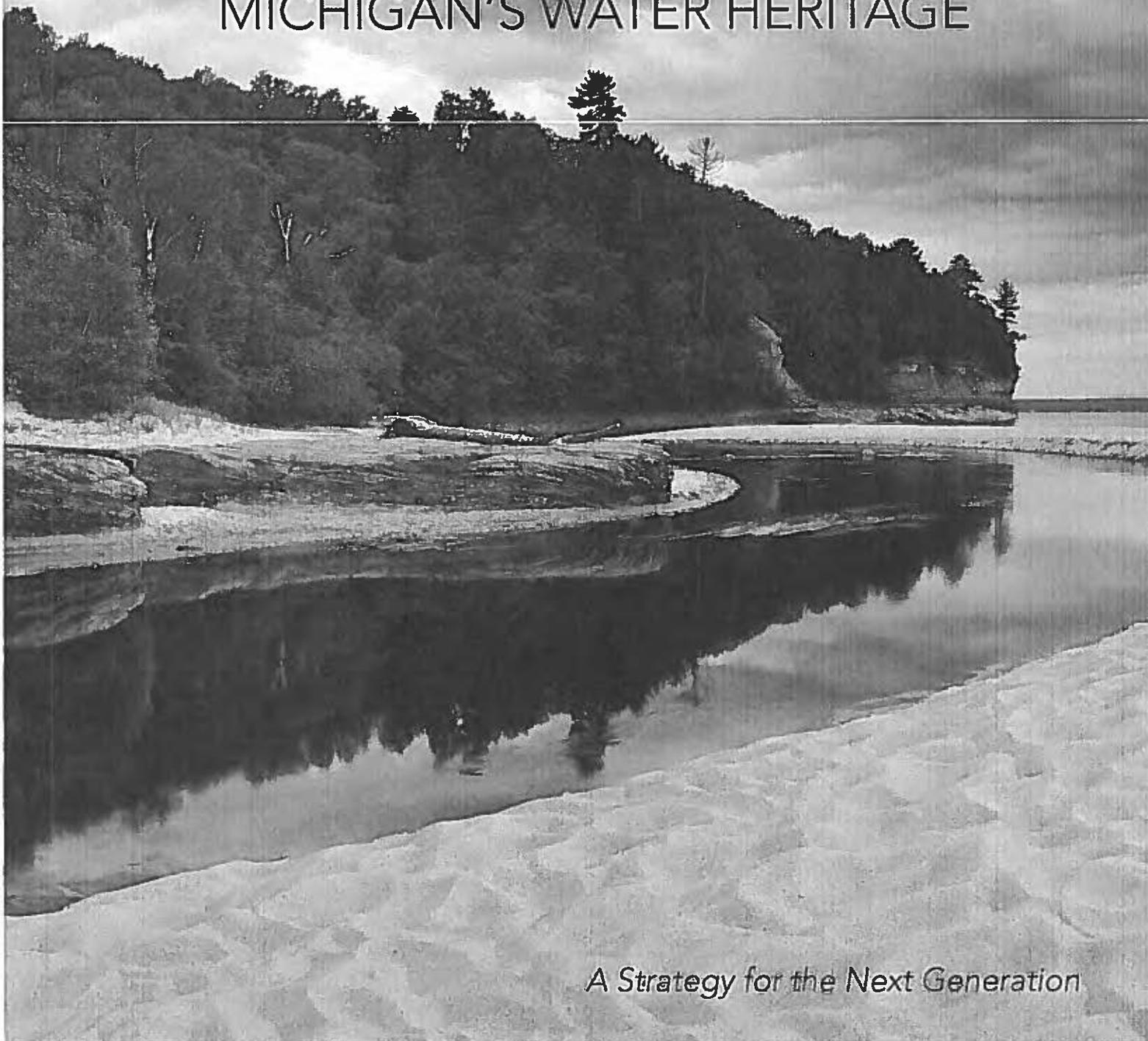
Laura A. Campbell, Manager
Agricultural Ecology Department



DRAFT

SUSTAINING

MICHIGAN'S WATER HERITAGE



A Strategy for the Next Generation

MAY 29, 2015 DRAFT

EMBARGOED – CONFIDENTIAL – FOR DISCUSSION PURPOSES ONLY – DO NOT DISTRIBUTE -

- DRAFT -

Prepared by:

**Michigan Office of the Great Lakes, *in Collaboration with*
Michigan Department of Environmental Quality
Michigan Department of Natural Resources
Michigan Department of Agriculture and Rural Development
Michigan Economic Development Corporation**

May 29, 2015

MAY 29, 2015 DRAFT

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Vision

Michigan's water resources support a healthy environment, healthy citizens, vibrant communities and sustainable economies.

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Introduction

Water defines Michigan. It is deeply rooted in the state's culture, heritage and economy. With more than 11,000 inland lakes, 76,000 miles of rivers, 6.5 million acres of wetlands and more than 3,200 miles of freshwater coastline—the longest in the world—leveraging the power and presence of this treasured natural resource and ensuring its long-term sustainability are critical to advancing Michigan's prosperity.

Clean, abundant freshwater is a competitive advantage for Michigan and it is growing in importance. At the beginning of 2015, the World Economic Forum in its global risk report identified water crisis as the number one risk influencing the global economy.¹ Michigan's water resources are vitally important for agricultural production, irrigation, drinking water, electric utilities, mining, manufacturing and water supply to lakes and streams that support valuable fish, waterfowl and wildlife populations. Michigan's abundant water assets and research capabilities, in addition to its highly-skilled talent, economic development expertise, innovation and invention, and powerful tourism and business marketing brand, are pivotal drivers for attracting business creation and investment.

With this abundance comes a deep sense of responsibility and stewardship—but Michigan has not always treated its water with a sense of care. Today, the state is slowly returning to a level of aquatic health in many waterways and lakes necessary to fully support diverse fish and wildlife and meaningful recreation in many communities. Through longstanding public and private partnerships and tremendous investment of time and resources, communities are making significant progress in cleaning up legacy contamination.

But that is just the beginning. The ability to achieve Michigan's vision for its water resources depends on a strategic, collaborative ecosystem-based plan that monitors the health and condition of our water resources, invests in water-related infrastructure, uses water more thoughtfully and efficiently to grow sustainable economies, reconnects communities to water, and fosters a water ethic and culture of stewardship.

Michigan's Water Strategy - An Ecosystems Approach

The forthcoming Water Strategy takes an ecosystem approach, focused on the fact that Michiganders are a part of the ecosystem in which we live and therefore have an effect on the health of our water resources. The Strategy recognizes the core values identified with water are four fold: economic, environmental, social and cultural. All are equally important. Communities across Michigan recognize the value of water quality improvement activities supported through state and federal investments. According to Brookings Institution and Grand Valley State University, restoring water quality and shorelines respectively result in a 3-to-1 and 6.6-to-1 return on investment in the form of increased property values and local economic development and improved ecosystem health and quality of life.

The value of water is not exclusively economic nor is it solely environmental, though without a healthy environment, human uses are diminished and fish and wildlife perish. Social value is represented as how water forms a basis for activity and time with friends and family, and how these uses create joy and memories. Cultural value is about identity and affinity to place: where we choose to live and why; who and what we identify with; and where our stories, myths and beliefs come from. For Michiganders, water – and especially the Great Lakes – forms a core part of identity and culture.

The approach recognizes that each of these four values needs to be addressed in balance with the others. They temper and mold each other; they exist together and may require compromise, accommodation and limits. This approach is reflected in the Strategy through its goals, outcomes and recommendations.

A Roadmap to Achieve the Vision

The Water Strategy outlines a 30-year vision shaped by a desire for high-quality, accessible water resources protected by and for present and future generations based on the question asked in multiple forums around the state: *“What do you want Michigan and Michigan’s water resources to look like and do over the next generation?”* Throughout the development of the Strategy, Michiganders said they care deeply about the Great Lakes, rivers and inland lakes, groundwater, and water in general. It is this caring that ultimately drives the ability to support, choose, manage and fund the requirements of healthy water. To that end, the Strategy recognizes that decisions made now regarding infrastructure, technology, monitoring and water literacy will set the course for decades.

Great Lakes, Water and Governance

The Great Lakes and Michigan water resources have long been recognized as a valuable resource fundamental to our way of life by federal and provincial governments, tribal nations and the eight states within the basin. The Great Lakes region has long-standing governance and institutional structures, organizations and other formal and informal mechanisms focused on protecting, restoring and maintaining the integrity of this vast water resource. These include the International Joint Commission, Great Lakes Water Quality Agreement, Great Lakes–St. Lawrence River Water Resource Compact Agreement, Council of Great Lakes Governors, Great Lakes Commission, Great Lakes Fishery Commission and many others. As a result, decisions made with regard to Michigan’s water resources are subject to collaboration, consultation, oversight and regulation under a complex framework of regional governance structures and federal, state and tribal laws.

Government-to-government relationships are an important part of the governance landscape in Michigan as recognized by the 2002 Government-to-Government Accord between the state of Michigan and the federally recognized Indian tribes within the state’s borders. For generations, the Indian tribes have resided in the Great Lakes region and

depended on the Great Lakes and Michigan's inland lakes, rivers, streams and groundwater for their way of life. These water resources provide food, transportation and drinking water, in addition to fulfilling many cultural purposes.

Exploitation of native fisheries, wildlife and forests during Michigan's emergence as the manufacturing center of the nation created great wealth and a high quality of life, but also devastated native fish populations, impacted water quality, and left a complex and costly legacy of contamination. Federal, state, tribal and local regulation and restoration programs have made substantial progress in addressing this legacy. This network of programs and actions has been instrumental in reaching toward the goals of ensuring drinkable, swimmable, and fishable waters as established in Michigan's Natural Resource and Environmental Protection Act, Safe Drinking Water Act, the federal Clean Water Act, and cleanup statutes such as the Environmental Remediation and Leaking Underground Storage Tank Act. In addition to these efforts, recent investments by the federal government through the Great Lakes Restoration Initiative have accelerated efforts to clean up and restore our water resources and fish and wildlife populations, and to improve quality of life in many communities.

Government-to-government relationships, statutes, regulations and management programs all play a critical and complementary role to the actions recommended in the Water Strategy. Driving progress toward the goals and the outcomes will depend on harnessing this complex framework of governance, institutions, and regulations to continue to build durable relationships and collaboration around common interests.

Strategic Action

The Water Strategy charts a course by providing recommendations and identifying strategic actions to:

Protect and Restore Aquatic Ecosystems – Michigan needs more integrated, holistic approaches to managing water on and across the landscape, including groundwater, which support healthy ecological systems and hydrologic integrity at the watershed scale.

Ensure Clean and Safe Waters - Michigan needs to protect and restore water quality to ensure ecosystem function and support current and future human uses of Michigan's surface and groundwater resources.

Create Vibrant Waterfronts - Michigan needs an emphasis on water resources as assets in state, regional and community planning efforts to create vibrant and sustainable communities, a robust recreation and tourism industry, and a thriving environment and economy.

Support Water-Based Recreation – Michigan needs to create greater opportunity for access to water resources through water trails and appropriate public access.

Promote Water-Based Economies – Michigan needs to collectively build robust multi-sector and multidisciplinary public-private partnerships between business, industry, academia, private capital and government. These partnerships will link ideation, invention and innovation, research and development, capital investment and end users. This approach will bring technologies to the market to better manage and solve water challenges in Michigan and across the globe. Directed research and development to address specific water challenges should provide the basis for forming a new paradigm of collaboration.

Invest in Water Infrastructure – Greater and consistent investments are needed in water-related infrastructure improvements to address aging and deteriorating systems that are now causing water quality issues and public health concerns. The people of Michigan also need to better recognize the connection between investments in water infrastructure systems and the benefits it provides, including delivery of safe drinking water, management of stormwater and wastewater, enhanced recreational opportunities, and healthy ecosystems and economies.

Monitor Water Quality - Michigan needs to develop and fund a coordinated, long-term monitoring strategy to provide baseline and trend information about surface and groundwater quality and quantity. This information is necessary to base decisions and best direct actions and future investments to support healthy people, ecosystems, communities and economies.

Build Governance Tools – Michigan needs to build new models of governance at the local and regional level to address increasingly complex and intractable problems facing Michigan's water resources. Implementation efforts will require not just state agencies, but a wide array of individuals, organizations, businesses, industries and tribal and local governments across the state to continue to build on this multi-stakeholder collaborative approach.

Inspire Stewardship for Clean Water – Most importantly, Michigan residents need greater opportunities to learn about water. Michigan is surrounded by 20 percent of the world's fresh surface water, and with that comes a deep ethical obligation to be good and thoughtful stewards of this global treasure. A shared water ethic will guide Michigan into the future and ensure our children and future generations will have the same or better quality of life than we have today. The durability of this Strategy and ensuring the health of our water resources for generations to come depends on creating a culture of stewardship through lifelong education about water.

We call on all people of Michigan to be thoughtful and engaged stewards of our water resources.

Water Strategy Framework

The Water Strategy is organized around nine goals and outcomes designed to ensure the viability and sustainability of Michigan’s water resources over time, while placing Michigan on the path to achieving its water vision in a way that builds economic capacity while sustaining ecological integrity of this crucial resource for future generations.

The Water Strategy includes 60 recommendations that are a set of interconnected ideas to drive a new relationship between Michigan’s communities, governments, and residents to solve complex water challenges and create greater opportunities for economic and social well-being. The recommendations are designed to drive performance and behavior change, address barriers and contribute toward achieving the desired outcomes. The ability to achieve the stated goals and outcomes will require both the implementation of recommendations in the Strategy and continued implementation of the entire suite of existing water-related programs and initiatives, some of which are noted in Appendix 3.

The Strategy includes an Implementation Plan (Table 2) comprised of recommendations, a lead actor charged with implementation and an implementation metric to measure progress toward accomplishing the recommendation. A wide host of actors and agents across the state, including governments, tribal nations, nonprofits, industry, businesses, individuals, and local and regional philanthropies will need to be involved. Therefore, the Water Strategy is not a specific action plan only for government, though there are many actions that government can and should take. Rather, it is a strategy for all people of Michigan, believing that together, we can have a positive impact on the future of the state.

Additional recommendations were identified during the development process as important to achieving outcomes but are of lesser priority and are included in Table 3.

Measures of Success

The Strategy includes measures of success intended to examine system response over time as a result of the collective impact of implementation of the Water Strategy recommendations and other efforts already underway by state, federal and local governments and partners to rebuild healthy aquatic systems, clean water and vibrant economies. Achieving success will require integrating planning strategies for water resources with local units of government, unifying plans between the state, regions and local units of governments, and collaborating with stakeholders. Additionally, success will require an integrated process for adapting to new science and understanding of complex issues, evaluating progress, and making course corrections necessary to achieve outcomes.

Table 1: Water Strategy Priority Recommendations and Measures of Success

Protect and Restore Aquatic Ecosystems	Goal 1: Michigan’s aquatic ecosystems are healthy and functional.	
	Outcome: Aquatic ecosystems are resilient and diverse	
	Recommendation	Measures of Success
	<ul style="list-style-type: none"> ▪ Prevent introduction of new AIS and control established populations. ▪ Develop a comprehensive strategy to reduce nuisance and harmful blue green algal blooms. ▪ Promote green infrastructure, low impact development and green spaces to rebuild hydrologic integrity and address storm water. 	<ul style="list-style-type: none"> ▪ Brook trout are present and thriving with no net loss of coldwater habitat due to water withdrawals and habitat manipulations. ▪ Sturgeon are considered rehabilitated in 10% of streams targeted for rehabilitation in Michigan’s Lake Sturgeon Rehabilitation Strategy. ▪ Lake trout are naturally reproducing and supporting wild fish-based fisheries in Lakes Superior, Huron, and Michigan. ▪ Achieve a 40% phosphorus reduction in the western Lake Erie basin. ▪ Waters of the state meet Water Quality Standards for being swimmable, fishable and drinkable. ▪ Reduction in annual volume of untreated sewage discharges. ▪ Reduce the number of designated use impairments due to wet weather discharges.
Ensure Safe and Clean Water	Goal 2 – Michigan’s water resources are clean and safe.	
	Outcome: Surface and groundwater are managed to support sustainable human uses and ecological function.	
	Recommendation	Measures of Success
	<ul style="list-style-type: none"> ▪ Protect drinking and source water from contamination and spills. ▪ Pass a statewide sanitary code and inspection requirements. ▪ Secure long-term funding to accelerate clean-up of contaminated sites. ▪ Establish priorities and address emerging pollutants of concern. 	<ul style="list-style-type: none"> ▪ 100 percent of the population has safe drinking water with no reported violations of health-based standards. ▪ No drinking water advisories, beach closures or aquatic life impairments due to harmful algal blooms. ▪ No designated use impairments due to failing on-site wastewater systems. ▪ No new designated use impairments due to emerging pollutants of concern

Summary of Comments on Draft Water Strategy and Appendices Laura Camp.pdf

Page: 10

T Number: 1 Author: lcampbe Subject: Highlight Date: 6/4/2015 11:40:12 AM

Is this really a measure of success? Would a better measure be the anticipated results from this reduction (e.g. improved fish health, reduction in nuisance algae and HABs, etc.)?

Create Vibrant Waterfronts	Goal 3 – Michigan communities use water as a strategic asset for community and economic development.	
	Outcome: Economic and community development plans and efforts fully leverage water assets to create great places to live, work and play.	
	Recommendation	Measures of Success
	<ul style="list-style-type: none"> ▪ Leverage water resource assets at state, regional and local level to create sustainable economic opportunities. ▪ Support investments in commercial harbors and ports and address long-term maritime infrastructure needs. 	<ul style="list-style-type: none"> ▪ All community and economic development plans integrate water resource assets.
Support Water-based Recreation	Goal 4 – Michigan’s water resources support quality natural resources, recreation and cultural opportunities.	
	Outcome: Waters of the state are world renowned for recreational pursuits such as hunting, fishing, boating and swimming.	
	Recommendation	Measures of Success
	<ul style="list-style-type: none"> ▪ Expand real-time monitoring of beaches. ▪ Prioritize investments in recreational harbors to address long-term infrastructure needs. ▪ Develop and implement a water trails system. 	<ul style="list-style-type: none"> ▪ 30% increase in water-based recreation and tourism. ▪ 90% of the population has convenient access to swimmable and fishable water. ▪ By 2020, 100% of the state’s recreation harbors will have an infrastructure asset management plan to ensure a safe harbor.
Promote Water-based Economies	Goal 5 – Michigan has a strategic focus on water technology and innovation to grow sustainable water-based economies.	
	Outcome: Policies and innovative technologies are developed and adopted to grow and promote sustainable water-based economies.	
	Recommendation	Measures of Success
	<ul style="list-style-type: none"> ▪ Accelerate water technologies to solve water problems using an entrepreneurial business-led initiative. ▪ Establish voluntary water efficiency targets for all major water dependent sectors. ▪ Develop a water conservation and reuse strategy. 	<ul style="list-style-type: none"> ▪ Michigan is recognized as a place to invest and locate a business because of its support for sustainable water technologies, water conservation, and high quality of life. ▪ Increase in percentage of economic output per gallon of water utilized. ▪ Increase in water sector employment and earnings at the statewide and county level.
Invest in Water Infrastructure	Goal 6 - Michigan invests in infrastructure and supports funding to maintain clean water and healthy aquatic ecosystems.	
	Outcome: People support investment of both public and private funding of Michigan water resources.	
	Recommendation	Measures of Success
	<ul style="list-style-type: none"> ▪ Establish a long-term Water Fund to achieve Water Strategy goals including water infrastructure management. 	<ul style="list-style-type: none"> ▪ Sustained funding is in place to implement the Water Strategy and achieve the goals of the Strategy.

T Number: 1 Author: lcampbe Subject: Highlight Date: 6/4/2015 11:36:27 AM

Given the recommendations listed here, would a better measurement of success be something related to the change in use or economic vitality of communities (or the areas with specific water assets)?

		<ul style="list-style-type: none"> Outcome-based asset management plans are implemented and progress is achieved toward true cost of service for water utilities. 			
Monitor Water Quality	Goal 7 - Michigan has integrated outcome-based monitoring systems that support critical water-based decisions.				
	Outcome: Monitoring systems are in place at a scale and frequency to ensure water quality and quantity are maintained to support diverse uses and values.				
	<table border="1"> <thead> <tr> <th>Recommendation</th> <th>Measures of Success</th> </tr> </thead> <tbody> <tr> <td> <ul style="list-style-type: none"> Implement a pilot water resource decision framework. Support groundwater and surface water monitoring. </td> <td> <ul style="list-style-type: none"> Achieve a net stabilization of groundwater depth across the state. Long-term monitoring strategies are being implemented. </td> </tr> </tbody> </table>	Recommendation	Measures of Success	<ul style="list-style-type: none"> Implement a pilot water resource decision framework. Support groundwater and surface water monitoring. 	<ul style="list-style-type: none"> Achieve a net stabilization of groundwater depth across the state. Long-term monitoring strategies are being implemented.
Recommendation	Measures of Success				
<ul style="list-style-type: none"> Implement a pilot water resource decision framework. Support groundwater and surface water monitoring. 	<ul style="list-style-type: none"> Achieve a net stabilization of groundwater depth across the state. Long-term monitoring strategies are being implemented. 				
Build Governance Tools	Goal 8 - Michigan has the governance tools to address water challenges and provide clean water and healthy aquatic ecosystems.				
	Outcome: Policies, organizational and institutional structures are in place to achieve goals and outcomes of the strategy.				
	<table border="1"> <thead> <tr> <th>Recommendation</th> <th>Measures of Success</th> </tr> </thead> <tbody> <tr> <td> <ul style="list-style-type: none"> Create an integrated system for managing water at the local level to achieve water quality and quantity outcomes. Retain full authority to continue to manage Michigan's water resources. </td> <td> <ul style="list-style-type: none"> By 2030, achieve a 40% reduction in number of designated uses or impaired waters. </td> </tr> </tbody> </table>	Recommendation	Measures of Success	<ul style="list-style-type: none"> Create an integrated system for managing water at the local level to achieve water quality and quantity outcomes. Retain full authority to continue to manage Michigan's water resources. 	<ul style="list-style-type: none"> By 2030, achieve a 40% reduction in number of designated uses or impaired waters.
Recommendation	Measures of Success				
<ul style="list-style-type: none"> Create an integrated system for managing water at the local level to achieve water quality and quantity outcomes. Retain full authority to continue to manage Michigan's water resources. 	<ul style="list-style-type: none"> By 2030, achieve a 40% reduction in number of designated uses or impaired waters. 				
Inspire Stewardship for Clean Water	Goal 9 - Michigan citizens are stewards of clean water and healthy aquatic ecosystems.				
	Outcome: Individuals and communities understand their responsibility for and make informed and responsible decisions regarding water resources.	Measures of Success			
	<ul style="list-style-type: none"> Integrate water literacy into state of Michigan curriculum standards. 	<ul style="list-style-type: none"> Increase the number of citizens with knowledge and understanding of water literacy principles. Michigan citizens support funding for water and implementation of the Water Strategy. 			

T Number: 1 Author: lcampbe Subject: Highlight Date: 6/4/2015 11:43:40 AM

Is this supposed to be equivalent to "no net loss" of groundwater? Glacial groundwater aquifers are naturally variable and should not result in policy changes because of their volumes from one year to the next. I think this measure needs to be rewritten to indicate success is the ability to track groundwater availability so that existing state statutes can do as they were intended to manage water use.

T Number: 2 Author: lcampbe Subject: Highlight Date: 6/4/2015 11:44:28 AM

Just a formatting comment--this should appear like the others, with the highlighted "Recommendation" and "Measures of Success" in the column headers.

Chapter 1: Protect and Restore Aquatic Ecosystems

Goal: Michigan’s aquatic ecosystems are healthy and functional.

Outcome: Aquatic ecosystems are resilient and diverse.

Healthy, functional ecosystems purify air and water, provide habitat for fish and wildlife, support natural resource-based economies, serve as buffers from flooding, and support recreational activities. All long-term, sustainable uses of water depend on intact ecological and hydrologic systems. Ecosystems link living organisms with the non-living components of their environment like the water, soil, and air. While the Strategy focuses on the water component of ecosystems, it recognizes that changes in the make up or distribution of organisms, disturbances on the land or in the air also impact water and that the management of water on and across the landscape or hydrology directly affects those systems.

For example, the introduction of aquatic invasive species (AIS) in the Great Lakes region has been a major challenge to the resiliency and diversity of aquatic ecosystems. The presence of invasive species combined with nutrient runoff can have devastating impacts on fisheries and other aquatic life, disrupt the ecology of lakes and streams as well as contribute to nuisance aquatic plant growth and algae blooms. In a few areas of the Great Lakes, nuisance algal growths have been associated with botulism outbreaks, “muck” (organic debris) washing up on beaches, and impacts to drinking water systems. Some nuisance algal growths have also been characterized as harmful algal blooms (HABs).

The practice of moving water off the landscape as quickly as possible has resulted in both positive and negative consequences. Since the mid-1800s, Michigan has developed more than 35,000 miles of public drains, serving more than 17 million acres of agricultural and urban lands and roadways. These drains provide benefits by removing excess storm water, preventing damage from flooding, improving soil productivity, and enabling residential and commercial development. However, these extensive drainage systems were designed without consideration of the long-term consequences of modifying the natural hydrology.

In addition, other hydrologic modifications like storm drains and extensive impervious surfaces contribute to less infiltration and increased surface water runoff and flow, resulting in increasingly “flashy” streams. These cause stream bank erosion and increase sediment loads, transporting nutrients that impair aquatic life. The loss of infiltration can reduce vital recharge of aquifers and reduce base flow to streams. In rural areas, infiltration to deeper depths is interrupted by tile drains designed to conduct water away

from fields. These changes can pollute receiving waters, impact aquatic life that depends on groundwater-fed streams during summer months, and affect human groundwater use.²

Changing weather events will also require changes in water management. While Michigan's future climate is unclear, variability in precipitation from year-to-year is large. Despite lower than average lake levels during the past decade, total annual precipitation has increased in the Great Lakes basin by 4.5 inches from 1915 to 2004, with 4.2 of those inches occurring from 1955 to 2004.³ The intensity of extreme weather events leads to more rapid runoff, greater flashiness in streams, sediment loadings and flooding events. Current infrastructure capacity was not designed to effectively handle this increase.

The Water Strategy focuses on reducing threats to aquatic ecosystems and implementing watershed-based approaches to restore hydrologic integrity and improve aquatic ecosystem resiliency. Holistic watershed-based approaches that slow the movement of water across the landscape, increase infiltration capacity, reduce erosion, sediment, nutrient flow and wastewater discharges, and increase aquifer recharge are needed for long-term preservation of Michigan's hydrology.

Prevent Introduction of and Manage Aquatic Invasive Species

Since the 1800s, more than 182 nonindigenous aquatic organisms, including animals, plants, bacteria and viruses, have colonized the Great Lakes ecosystem, forever altering its ecology. The introduction of AIS into the Great Lakes and inland waters has caused significant damage to the state's natural resources and many human uses.

Impacts include Eurasian water milfoil clogging inland lakes, the devastating effects of sea lamprey on fish communities, round gobies taking bait, and water fleas snagging fishing lines. Of particular note, invasive mussels have disrupted the energy flow, nutrient cycling and food web which has resulted in changes in fish communities and have contributed to nuisance aquatic plant growth and algae blooms. The intensive filtering activities of zebra and quagga mussels have greatly increased water clarity, allowing the long filamentous algae known as Cladophora, as well as other types of algae, to grow to nuisance levels in areas where it previously did not occur. When Cladophora dies and breaks loose, it creates conditions ripe for the production of the botulinum toxin in Great Lakes sediments by creating the very low oxygen conditions required by Type E botulism spores to become active. Type E botulism outbreaks have resulted in the death of waterbirds and fish kills. While there are no management options currently available for broad-scale control of zebra and quagga mussels, there are ongoing efforts to evaluate the efficacy of new management options such as the biocide Zequanox, a naturally occurring bacteria being tested to specifically control zebra and quagga mussel populations.

T Number: 1 Author: lcampbe Subject: Highlight Date: 6/4/2015 11:45:53 AM

"Affect" in what way? This is unclear. the example of affecting human groundwater use should either be clarified or left out of the sentence.

T Number: 2 Author: lcampbe Subject: Highlight Date: 6/4/2015 11:48:19 AM

This sentence is awkward, and makes it sound like the lake levels cause the increase in precipitation. Should be: "Despite increased precipitation by... lake levels remained low for a decade before recent increases noted in 2014 and 2015."

T Number: 3 Author: lcampbe Subject: Highlight Date: 6/4/2015 11:50:09 AM

These examples may be designed to relate the AIS problem to a casual reader, but it seems like the disruption they cause to the foodweb and native species is a more severe problem and the better example to include here.

Michigan has led the region for decades in focusing on prevention of new introductions and minimizing impacts of established invasive species. To combat the introduction of new AIS and minimizing the impacts of established ones, Michigan developed the second state AIS management plan in 1996, later updating it in 2013. It provides a comprehensive strategy outlining new actions and enhancing existing efforts to prevent and control AIS in Michigan waters, including continued support for separation of the Great Lakes and Mississippi watersheds. In addition, the Michigan Department of Natural Resource's Fisheries Division Strategic Plan, *Charting the Course: Fisheries Division's Framework for Managing Aquatic Resources*, provides specific actions to support healthy aquatic ecosystems and sustainable fish populations. It also provides strategic assessments and tools to inform decision-making. However, more is needed. Long-term mandates for the prevention of new invasive species into the basin will depend on a collaborative approach.

Recommendations

Prevent the introduction of new AIS and control existing AIS populations in accordance with the Michigan Aquatic Invasive Species Management Plan.

Work with other Great Lakes states and provinces to harmonize aquatic invasive species prevention, early detection processes, and response actions across the Great Lakes region.

Accelerate research and solutions to identify mechanisms of food web disruption and changes of nutrient flows in the Great Lakes with a focus on the effects of invasive species.

Reduce Occurrence and Impacts of Harmful and Nuisance Algal Blooms

Nuisance algal blooms are increasingly a problem in the Great Lakes and have been documented in some inland waters. Some algal blooms are dominated by blue-green algae also known as cyanobacteria that produce harmful toxins and these blooms are characterized as harmful algal blooms (HABs) based on concentrations of toxins produced. The most common algal toxins are Microcystin, Anatoxin-a, Cylindrospermopsin, and Saxitoxin. For example, the toxin Microcystin is produced by the cyanobacteria *Microcystis*. HABs occur when Microcystin exceeds the World Health Organization's non-drinking water guideline of 20 ug/l or drinking water criteria of 1 ug/l in water bodies with drinking water intakes. However, state agencies will likely adopt new criteria as additional information becomes available.

The presence of these toxins are known to impact human health and aquatic life can cause closures of drinking water systems and beaches, including a well-publicized HAB in western Lake Erie in 2014 that prompted Toledo officials to shut down the drinking water system and a few areas in Michigan. Health symptoms commonly associated with algal toxin exposure include nausea, skin rashes, gastro-intestinal distress, numbness and fatigue.⁴ These toxins can also kill fish and other aquatic life. The most commonly

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monitored algal toxin in Michigan is Microcystin; however, MDEQ is evaluating monitoring protocols for other toxins.

Algal blooms are caused by many factors, including excessive inputs of nutrients, usually phosphorus and to a lesser extent nitrogen. Meteorological conditions can also play a role in determining algal bloom severity and seasonal dynamics. For example, the occurrence and duration of extreme weather events, such as heavy rainfall and droughts, may influence the development of algal blooms by intensifying the magnitude and timing of nutrient delivery from the watershed.⁵ In addition, changes in the food web caused by the introduction of invasive species can change the way nutrients are partitioned in the environment or change environmental conditions enough to trigger algal blooms. Physical factors affecting water temperature, light penetration and water column mixing may also contribute to create potentially favorable conditions for algal blooms.

Addressing agricultural point and nonpoint sources of sediment and nutrients that have been identified as a major source of the pollutants in recent western Lake Erie Basin studies conducted in both Michigan and Ohio is one step to combating HABs. These opportunities include promoting changes in the use of phosphorus through mechanisms like the 4R Program (Right Source, Right Rate, Right Time, Right Place), implementation of the Michigan Agriculture Environmental Assurance Program (MAEAP) suite of practices, restoration of grasslands and wetlands, use of vegetative filter strips, and use of technologies like precision farming and implementing no-till and conservation tillage techniques to reduce run-off.

However, the biggest challenge remains the lack of a comprehensive understanding of the cause of HABs in Michigan's waters. For example, HABs that are capable of producing toxins are not limited to nutrient rich waters and can be found in nutrient poor waters like oligotrophic lakes. It is not possible to tell visually (including via satellite), by taste or by odor whether a bloom is a HAB. Additional work must be done in order for state, federal and local partners to make strategic decisions to determine best possible solutions to address the problem. A strategy to prevent HABs should be developed, involving a broad set of state, federal and local partners and including conducting additional monitoring and data collection to improve the understanding of the cause of HABs and inform models and actions to achieve the desired water quality and public health outcomes.

Recommendations

Develop a comprehensive strategy to reduce nuisance and harmful blue green algal blooms.

Develop harmful algal toxin water quality criteria and implement a real-time monitoring strategy for Michigan's Great Lakes drinking water intakes and public recreation locations threatened by harmful algae.

Support the development of a national drinking water advisory or action level target for harmful algal toxins.

Integrate Water Knowledge into Local Land Use Planning

Land use planning is inextricably linked to healthy aquatic ecosystems, a clean and available water supply, and protection from natural occurrences that can damage property. In Michigan, decisions about how the land can be used are made at the local level through master planning and zoning ordinances. Communities use these tools to plan and guide the character of the community and influence the local economy.

However, local community and economic development planning is based on political boundaries and jurisdictions, not along watershed boundaries. To be effective, these planning tools should consider activities that adversely affect water quality and quantity, such as extreme weather events, throughout their watershed and incorporate best management practices into transportation, infrastructure and zoning regulations and other community development planning to minimize impacts on local water resources.

Recommendations

Incorporate planning for wet weather extremes and increased variability into state, regional, and community planning.

Provide technical assistance and develop technical tools and training programs for communities, local officials and water stakeholders to inform and improve their water literacy and help them integrate water impacts into local land-use planning and decisions.

Build Resiliency into Riparian Systems

One of the most direct ways to positively influence water quality and aquatic habitat is to restore, create and improve riparian areas. Riparian areas, or land area adjacent to a stream or lake, provide critical ecosystem services and benefits for lakes and rivers, including:

- Reducing runoff by acting as a barrier and protecting against erosion and nonpoint source pollution
- Absorbing contaminants
- Moderating water temperature through shading
- Serving as a greenway corridor for birds, mammals, amphibians and reptiles
- Contributing leaves, woody debris and other organic matter as foundation for the food web and providing in-stream habitat for fish and other aquatic organisms
- Providing pleasing recreational corridors or viewsapes

Accelerated erosion and sedimentation problems occur in rivers throughout Michigan as a result of lack of riparian management. In some watersheds, lack of upstream riparian filter strips or buffers results in the need for increased downstream dredging at river mouths for

boat access and international shipping. Hardening of the riparian zones, lack of shade due to deforestation, and a lack of continuity in riparian areas all contribute to increased stream temperatures, resulting in declines of fish and wildlife habitat.

Currently a patchwork of regulations, including watershed management plans, best management practices, state programs and landowner incentives, are used to manage riparian zones. The success of many voluntary programs, however, is contingent on a well-informed and cooperative landowner. To maximize benefits, a more holistic watershed approach is needed for riparian area management. Taking a broad approach starting upstream and working downstream to the mouth of the river can have comprehensive impacts on aquatic ecosystems, international shipping, and river recreation. In addition, the interest in waterfront development combined with the need to decrease management costs (dredging) and reduce impacts of extreme weather events provides an opportunity to better define science-based actions and consciously manage riparian areas throughout Michigan.

Recommendation

Develop tools and guidance related to shoreline and riparian ecology and management and provide necessary technical support and training to municipalities, watershed-based organizations and landowners to achieve full benefits of riparian areas.

Restore Hydrologic Connectivity

Michigan has more than 2,500 dams, the majority of which are nearing or have exceeded their design life. Federal, state and local governments as well as conservation organizations are removing dams that provide little to no natural resource value to reconnect streams and rivers. However, challenges exist including: ownership questions (74 percent of dams are privately owned), financial burdens, social views on dam removal and value of impoundments behind dams. Additionally, careful considerations must be made to prevent the upstream movement of unwanted invasive species and downstream movement of contaminated sediment trapped behind dams.

Despite these challenges, federal, state and locally funded efforts have achieved progress in restoring connectivity. As examples, dam removal and river restoration projects are re-envisioning the role of the Boardman, Cass and Huron Rivers. These restoration efforts create greater opportunity for recreation and economic development by connecting water and place within communities.

Recommendations

Remove or improve dams that are no longer safe or ecologically, economically or socially viable to protect public safety and create healthy connected aquatic systems.

Focus river and stream restoration efforts on addressing small hydrological impediments like culverts to create connectivity and restore stream stability.

Manage Groundwater Withdrawals

Michigan's water resources are vitally important for agricultural production, irrigation, drinking water, electric utilities, mining, manufacturing and water supply to lakes and streams that support valuable fish, waterfowl and wildlife populations. Despite the large volumes of surface and groundwater in Michigan – more than one quadrillion gallons by some estimates – there is growing concern about its use and about groundwater withdrawal effects on environmental function and integrity. Groundwater use and value is increasing, and the state must invest in the information and decision systems to realize groundwater's full value, promote its wise use, and protect its hydrological and ecological integrity.

Groundwater is an important resource for commercial, industrial, domestic, and public supply purposes. Most of Michigan's large groundwater withdrawals, however, are for agricultural irrigation. More than 2,500 high-capacity irrigation groundwater wells have been registered for installation during the past four years. These wells greatly enhance economic development (in particular agricultural productivity), ensure against drought conditions and augment high-value crop production. However, as farmers and others develop more high-capacity irrigation wells, the odds of interfering with nearby domestic wells and surface water systems like rivers and lakes also increase.

Michigan has developed the Michigan's Water Withdrawal Assessment Tool to help the state manage groundwater withdrawals. A new or increased high-capacity well must be evaluated using the groundwater tool before installation. The Groundwater Tool is specifically designed to assess the likelihood of an adverse impact of withdrawals on nearby streams, rivers and fish communities. Michigan's Water Use Advisory Council, established by MDEQ in 2012, completed its assessment of Michigan's water management framework, including the Water Withdrawal Assessment Tool, and issued a series of recommendations to MDEQ in December 2014. The recommendations are now under departmental review and assessment. The development of a robust and effective water management program for the state will be an ongoing, iterative process and the insights and recommendations such as the ones in the council's report will continue to help shape the development of that process.

Recommendation

Refine and improve the water withdrawal assessment process to ensure sustainable use of water resources and that high priority is given to incorporating existing and new data and models to better represent local and regional water resources and surface water/groundwater interactions.

Number: 1 Author: lcampbe Subject: Highlight Date: 6/4/2015 11:52:47 AM

Remove--too many "however"s in this paragraph and it overemphasizes the importance of withdrawals to agriculture at the expense of other uses, which is not needed since the next sentence provides the numbers of ag wells.

Improve Water Management in Urban Landscapes

In urban areas impervious surfaces like roads, buildings and parking lots prevent rainfall from penetrating the soil. As natural vegetation is removed and these surfaces increase, the amount of evapotranspiration and groundwater recharge decreases. This causes increased runoff, stream channel erosion, buried river bottoms due to silt and sediment, reduced or lost habitat, and aquatic species decline. Aging infrastructure and ill-managed or improperly managed stormwater runoff also contributes to sewer overflows, affecting water quality, ecological systems, creating human health risks, and negatively impacting the enjoyment of water resources.

As municipalities struggle to address aging infrastructure and capacity issues, opportunities exist to transition away from grey to green infrastructure. Green infrastructure can increase a community's resiliency to severe weather events by increasing infiltration and absorption of water. This reduces flooding risk, decreases surface runoff into lakes and streams, and reduces impacts of aging systems. Many communities are considering developing green infrastructure such as wetlands, bioswales, green spaces and buffer strips, as well as man-made infrastructure like rain gardens. Overcoming barriers to green infrastructure such as limited funding mechanisms, regulatory and permitting requirements, institutional and organizational capacity, and lack of understanding of design and maintenance requirements will be necessary to improve water management and address stormwater.

Recommendations

Provide technical and financial support to communities to plan and implement green infrastructure techniques and low-impact development while preserving natural spaces in the design of new developments, redevelopments and road projects to ensure responsible stormwater management and improve hydrology.

Modernize road and highway planning and infrastructure to effectively accommodate stormwater runoff and infiltration needs, thereby reducing the costs and impacts of flooding.

Enhance financial and technical support of local stakeholder efforts to develop and implement watershed management plans to restore impaired waters, protect high-quality waters, and develop and utilize local water resource assets.

Use existing authority to work with local unit of governments with stormwater discharge or stormwater-related hydrologic impairments in their waterways to establish Phase II stormwater plans for impaired water bodies.

Improve Water Management in Rural Landscapes

Michigan's \$5.5 billion drainage infrastructure sustains some of the most productive agricultural land in the world and became the key component to developing land for residential, commercial, industrial and transportation purposes. However, the historical land changes that led to this productivity, such as the draining of wetlands, dredging and straightening of rivers and streams, converting streams to drains, and deforestation, have resulted in degraded water quality and aquatic ecosystems.

The agricultural community understands the importance of water resource conservation and is continuously considering new methods for managing water, including restoring hydrology, enhancing soil's capacity to retain and infiltrate rainfall, and allowing for aquifer recharge. New science and technological advancements are also impacting agricultural water management with research in areas such as identifying the most efficient irrigation timing and amounts for crops in dry weather conditions, water reuse for irrigation, and reducing nutrient loss via tile lines.

The federal Agriculture Act of 2014 commonly known as the Farm Bill is also providing resources to enhance conservation practice implementation in Michigan to address nutrients and sediment. Other initiatives are underway such as the newly formed regional and community-led Healthy Waters Working Farms that combines conservation practices and farmland preservation to keep Michigan's rivers and lakes clean while keeping the best farmland working.

It is critical that governments, academia and industry collaborate to develop new tools, processes, and systems to help local officials, landowners, agricultural producers, and others who impact the rural landscape to take actions to improve water resources. The Natural Resource Working Group has concluded that the establishment of collaborative partnerships to support learning and adaptation is needed to foster community-based natural resource management. Engaging the rural community as a whole in deciding what behaviors should change to maintain and improve water quality, and determine what actions would be necessary to encourage behavior change, are necessary to drive performance toward desired outcomes on the landscape.

Recommendation

Eliminate impairments in priority watersheds that have degraded water quality and/or aquatic ecosystems due to nutrient runoff and soil erosion. Engage landowners through a collaborative and adaptive community-based natural resource management process to identify local actions to change behaviors and solutions to achieve those outcomes. Failure to achieve demonstrable outcomes within established timeframes could trigger additional measures.

T Number: 1 Author: lcampbe Subject: Highlight Date: 6/4/2015 11:55:50 AM

This appears to be the only recommendation that calls for enforcement action on the regulated parties, and does not align with the written description above about tools, technology, innovation, and voluntary action. We cannot support this portion of the recommendation.

Chapter 2: Ensure Clean and Safe Water

Goal: Michigan's water resources are clean and safe.

Outcome: Surface and groundwater are managed to support sustainable human uses and ecosystem function.

Clean, safe water is fundamental to Michigan's economy and to ensuring high-quality places to live, work and play. It is equally fundamental for functioning and sustainable aquatic systems.

Michigan faces complex challenges in addressing water resource issues because of a wide range of historic and ongoing activities such as deposition of mercury, legacy pollutants (i.e. polychlorinated biphenyls (PCBs)), chemical contamination, nonpoint sources of excessive sediment and nutrients (i.e. phosphorous), harmful algal growth, changing climate, urban and rural runoff, hydrologic impairment of rivers and streams, contaminated sediment, and invasive species. All of these things continue to stress drinking water supplies, groundwater resources, aquatic systems, water-based recreation, and local economies.

During the past 100 years, water resource concerns have shifted largely from regulating activities such as effluent pollution and dredge and fill to focus on water resource challenges caused by multiple stressors that require both traditional and new regulatory solutions. Protecting and restoring water quality is critical to ensure ecosystem function while supporting current and future human uses of Michigan's surface and groundwater resources.

Protect Drinking Water Supplies

Ensuring adequate and safe drinking water for all of Michigan's nearly 10 million residents and visitors is essential to protecting public health. The state has more than 10,500 public water systems, of which roughly 8,500 utilize untreated or largely untreated high-quality groundwater sources. In addition, Michigan has more than 1 million private domestic wells, more than any other state in the U.S.

While public water supplies are subject to oversight and frequent inspections to ensure sanitary conditions, individual residential water well owners are responsible for maintenance of their own wells. Construction of private wells is primarily handled at the local level and overseen by a rigorous permitting program. Improper well siting and construction and maintenance, however, are known contributors to drinking water contamination. Broken well caps and contamination sources placed near wells are some of

the problems that put drinking water and groundwater at risk. Therefore, planning for appropriate residential and public drinking water well placement, coupled with proper well construction by a Michigan-registered drilling contractor, are the foundation for safe and reliable drinking water. In addition, periodic inspections of private drinking water wells are needed to ensure sanitary conditions.

Another risk to Michigan's water resources are the estimated 2 million improperly abandoned wells. These abandoned wells can act as a direct conduit between the surface and underlying aquifers as well as between aquifers. These conduits can result in surface contaminants flowing into private or public drinking water supplies.

The lack of statewide regulations or controls on the installation of closed-loop geothermal borings poses additional risks. Improperly located or constructed closed-loop geothermal borings have the same potential to harm aquifers as improperly abandoned water wells. Many vertical geothermal borings are installed at the same depths as drinking water wells, but have no regulatory oversight to ensure installation does not create a direct conduit for contaminants to reach the aquifer.

In many areas of the state, nitrate contamination is a concern. In Michigan, the U.S. Geological Survey regards nitrate-N levels of more than 2 milligrams/liter in water as a sign that human-related nitrate sources have adversely affected the water. **In rural areas, elevated levels of nitrate can be associated with animal manure and agricultural fertilizers.** Septic systems can also serve as a source of nitrate contamination, though that risk is minor if the systems are designed and maintained for nitrogen removal and water wells are properly sited, constructed and maintained.

Additionally, businesses and industries generate wastes that can threaten groundwater quality if not handled properly. Groundwater contamination resulting from improper waste disposal and chemical handling threatens public health and the environment, resulting in significant cleanup costs to businesses. In addition, contamination of public water supplies can result in high costs to public water suppliers and taxpayers to provide alternative water or replace contaminated drinking water supplies.

Further, the release of oils, chemicals, salts and polluting materials from human activities and industrial sites can impact water. A majority of these releases can be prevented through regulatory programs, but releases still occur unexpectedly. Appropriate response actions to control, mitigate and remediate these releases are critical to minimize harm to Michigan's surface and groundwater.

T Number: 1 Author: lcampbe Subject: Highlight Date: 6/4/2015 11:59:14 AM

In the septic and business examples the language includes "if not handled properly" and qualifiers that say contamination risk is minimal if managed properly. This sentence needs the same type of qualifier to indicate that use of manure and fertilizers can cause elevated of nitrate if not managed properly. Otherwise it seems to state that agriculture is inherently polluting with no solution.

Recommendations

Protect drinking and source water areas by:

- *Continuing to ensure remediation activities address the long-term impact on drinking water sources*
- *Identifying and diligently protecting source water protection areas*
- *Assisting well owners with identifying potential water well vulnerabilities*
- *Focusing resources on contamination sources with the highest potential for causing contamination of drinking water supplies, including chemical storage facilities*
- *Enhancing the drinking water geographic information system database and making information available across MDEQ programs and to local public health department environmental health personnel*
- *Supporting mapping of local groundwater conditions in partnership with well contractors and others who collect groundwater information*

Develop a plan for aquifer protection that addresses geothermal construction and proper abandonment of wells.

Establish inspection requirements for residential wells, including testing wells for nitrates, bacteria and arsenic.

Develop a spill and communication strategy and organize an incident command approach to prevent, prepare for and respond to environmental disasters and chemical releases.

Properly Maintain On-Site Wastewater Systems

Michigan has about 1.3 million on-site wastewater systems (septic systems) that serve as permanent wastewater infrastructure for more than 30 percent of homes and businesses. At least 30,000 of these are commercial and community subsurface disposal systems treating sanitary wastewater with flows up to 10,000 gallons per day. Since more than half of new single-family homes are built with on-site wastewater systems, this reliance will continue to expand. However, no central system exists that tracks these on-site systems' precise locations, conditions or risks to sources of water. Adequately managed on-site wastewater treatment systems are a cost-effective and long-term option for meeting public health and water quality goals, but the key to their use is in proper siting, adequate management and maintenance.

Currently, local health departments in only 11 Michigan counties conduct inspections of on-site wastewater systems at the time of real estate transactions. These counties report that the number of systems in some manner of failure or improper operations averages about 10 percent but ranges as high as 23 percent. Assuming an average failure rate of 10 percent across the state, at least 130,000 systems discharging a total of 31 million gallons per day could be experiencing operational problems and adversely affecting local waterways and groundwater. Since local health departments issue only about 5,000

replacement permits annually for existing systems that have failed, there are likely a significant number of unidentified, failing systems statewide.

Michigan is the only state without a specific law related to individual or small-quantity on-site wastewater treatment systems. The systems are regulated to some degree, but the regulatory focus is largely on siting and construction of new systems and not on maintenance, system performance or condition. A combination of local codes and state criteria have contributed to a non-uniform patchwork of regulatory control over conventional septic tank and drain field siting, design and construction. A 2014 MDEQ stakeholder process concluded the state should develop science-based standards for site suitability, design, operation and maintenance, as well as requirements for oversight and inspection for all systems after construction. In addition, homeowner education about proper on-site system maintenance is needed and a state-facilitated loan mechanism to financially assist homeowners with on-site replacement should be explored. To date, this work has not been completed, and the Legislature has not passed such a statute.

Recommendations

Develop and implement a uniform statewide sanitary code that is flexible and provides standards for site suitability based on risk.

Establish a long-term sustainable funding source to support on-site wastewater programs at the state and local levels and to assist financially distressed owners of private on-site wastewater systems with repair and replacement costs.

Establish inspection requirements for residential on-site wastewater systems.

Develop marketing and education campaigns and outreach tools directed at homeowners regarding on-site wastewater management and maintenance and funding opportunities to assist with repair and replacement.

Clean Up Legacy Contamination

Michigan's historic industrial and commercial activities left many areas of legacy contamination. Some of the worst contamination problems in Michigan's waters still exist at superfund sites and in Areas of Concern (AOCs). In addition, the state suffers from more than 8,500 leaking underground storage tank sites and more than 9,700 other sites of environmental contamination. Common sources of contaminants include hazardous substance releases, contaminated sediments, atmospheric deposition, industrial discharges, sewage treatment plant discharges, combined sewer overflows, nonpoint source pollution and runoff from industrial sites. These sources of contamination threaten aquatic life, create an economic drag on communities, and prevent opportunities for use and enjoyment of Michigan's water.

Twelve of Michigan's original 14 AOCs remain on the list of formally designated areas of legacy contamination under the Great Lakes Water Quality Agreement. Today, 33 of the

sites' 111 beneficial uses have been restored, with several more in the process of being formally assessed. Michigan recently celebrated the successful delisting of Deer Lake in Marquette County and White Lake in Muskegon County; all of their beneficial uses have been restored.

Public funds play a vital role in addressing contaminated sites where no responsible party exists or has the ability to fund cleanup activities. These funds are used to investigate the extent of contamination, evaluate and abate the risks associated with the hazardous substances present, and perform cleanup activities to protect the public and environment. They are also used to leverage private resources, stretching their impact. Funding programs like the GLRI (which must be funded annually and therefore is not a certainty), Great Lakes Legacy Act Program, Clean Michigan Initiative Bond, Brownfield redevelopment programs, and Leaking Underground Storage Tank cleanups contribute to Michigan's transformation. Their dollars turn blighted, unusable contaminated properties into opportunities for investment and revitalization in communities.

However, except for the GLRI, these funding sources are now nearly depleted. Continued advocacy for these important federal and state funding programs is needed to continue this transformational work. Critical cleanup efforts are still needed in Michigan to address other areas with significant contamination, including several areas within the Detroit River, the lower reach of the Rouge River, ¹Velsicol Chemical on the Pine River in St. Louis and PCBs in the River Raisin, the Kalamazoo River, in the Ten Mile Drain on Lake St. Clair and in Torch Lake in Houghton County. While several of the locations mentioned above are currently under ongoing corrective action, work at many locations on the Detroit River and the lower section of the Rouge River are just beginning. Michigan cannot afford to give up the progress that it has made to this point, and there is more work to be done.

Recommendation

Secure a long-term funding source to accelerate the cleanup of legacy contaminated sites.

Prevent Environmental Impacts from Emerging Contaminants

New and emerging pollutants like ²antibiotics, endocrine disruptors found in fire retardants, rocket fuel, industrial wastes, existing and new ³pharmaceuticals, plastic microbeads, and pesticides and their metabolites are all now detected in the environment. The risk to humans, wildlife and the environment from any one of these, let alone the combination of them, is not well understood.

Effective removal varies based on the type of chemical and individual treatment system. Current wastewater treatment systems and drinking water plants are not designed to remove many of these new and emerging pollutants which can accumulate in waterways and cause harm.

T Number: 1 Author: lcampbe Subject: Highlight Date: 6/4/2015 12:00:23 PM

This is a little odd that it's the only specific company listed as an example rather than the other examples only listing geographic locations of contamination...

T Number: 2 Author: lcampbe Subject: Highlight Date: 6/4/2015 12:00:43 PM

T Number: 3 Author: lcampbe Subject: Highlight Date: 6/4/2015 12:01:24 PM

Is there a reason "antibiotics" and "pharmaceuticals" are listed separately?

Michigan uses surface water monitoring programs to identify and assess emerging pollutants. The state also relies on EPA's drinking water standard setting process, which includes periodic monitoring for new contaminants to determine how often the substance is identified, at what levels, and if a standard should be established to provide appropriate public health protection. Efforts should be taken to reduce environmental impacts from emerging contaminants through safe disposal, reuse or recycling, the use of technologies, product redesign or discontinued use.

Recommendations

Pass comprehensive legislation phasing out the use and sale of microbeads in Michigan.

Establish research priorities for emerging pollutants of concern in partnership with Michigan's research universities to:

- *Better understand potential ecological and human health impacts*
- *Adapt monitoring protocols to detect concentrations, fate and transport*
- *Recommend standards for protection of human health and the environment*
- *Develop technologies to remove such pollutants from manufacturing processes*

Chapter 3: Create Vibrant Waterfronts

Goal: Michigan communities use water as a strategic asset for community and economic development.

Outcome: Economic and community development plans and efforts fully leverage assets to create great places to live, work, and play.

Michigan's abundant water resources including its coasts, harbors, rivers, lakes and streams make many communities desirable places to live, work and play. Historically, Michigan's waterfronts supported industries such as shipbuilding, power production, lumber yards, tanneries and chemical production. Many communities developed commercial centers with their backs to the water. As industries abandoned the waterfront, many became eyesores and the public's connection to water as a community asset was lost.

But initiatives such as the federal Clean Water Act, corresponding state water regulations, strong local champions, and recent investments from the GLRI have turned polluted waters into thriving systems. As a result, communities began to rediscover their waterfronts and reimagine their communities focusing on their water resources. Water is once again playing a pivotal role in transforming communities' economies and is reflected in their values and desires.

Integrate Water Assets into All Planning Initiatives

Including water assets in community development reestablishes the connection between citizens and the outdoors, building a sense of place and improving overall quality of life. The way people relate to water in their community can drive ecological, economic and social outcomes. A stronger understanding of this relationship is needed to assist communities with economic and community development through proper land use planning and form-based design.

By understanding this relationship, communities can more effectively integrate water as a strategic asset, maximize economic and social capital, strengthen the relationship people have to water, and avoid potential challenges with conflicting or unaligned policies or actions. Ultimately, creating greater opportunities to interact with local water resources can help foster a water conservation ethic in individuals and the community.

Research shows people are willing to pay more to locate to areas with access to clean water and good environmental quality.⁶ Residents drawn to these environmentally attractive places help communities create more wealth and more jobs. Studies by the Brookings Institution and Grand Valley State University show a 3-to-1 and 6.6-to-1 return,

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respectively, on investments in restoring water quality and shorelines in the form of increased property values and local economic development.

Recommendation

Emphasize water resources as assets in state, regional and community planning efforts to provide appropriate sustainable protection and fully leverage community-based economic opportunities.

Foster Community Leadership to Reconnect Communities to Water

Fully leveraging water assets will require fostering community leadership and local champions. These leaders, both inside and outside of government, should fashion a comprehensive, community-informed vision, strategy and implementation plan for stitching water into the fabric of their communities. The strategy and implementation plan must balance both economic opportunities and environmental protection to ensure sustainability. Communities such as Alpena have embraced their maritime heritage with partnerships between the community and the National Oceanic and Atmospheric Administration's Thunder Bay Sanctuary. Grand Rapids is reimagining its relationship with the Grand River through its plans to reinstate its namesake rapids. The magnificent Detroit River transformation has been under way for nearly a decade under the leadership of the Detroit Riverfront Conservancy. Many other communities including Marquette, Flint, Kalamazoo, Battle Creek, Traverse City, Boyne City and Petoskey have also refocused the role that their waterfronts play in their community's vibrancy. Their experiences provide powerful case studies to share with other Michigan communities.

Recommendations

Host an annual mayor's summit focused on creating high quality communities that leverage strategic water assets.

Provide in-depth technical assistance to support communities with developing and implementing community visions and strategies for waterfront redevelopment, access and use.

Create Sustainable Commercial Ports and Harbors

Maritime trade use of the state's deep-water commercial ports is essential to Michigan, regional economies and many coastal communities. Investment in physical infrastructure is needed to maintain access to Great Lakes commercial ports while ensuring they are deep enough to accommodate commercial shipping vessels; this requires regular dredging. Michigan, ¹¹however, has neither received nor dedicated adequate dredging funding. However, the maintenance of channels, ports and harbors is only partially the responsibility of the state and federal government and therefore needs to be incorporated into the business models of maritime companies.

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Chapter 4: Support Water-Based Recreation

Goal: Michigan's water resources support quality natural resources, recreation and cultural opportunities.

Outcome: Waters of the state are world renowned for water-based recreational pursuits such as hunting, fishing, boating and swimming.

Michigan's four Great Lakes, 11,000 inland lakes, 76,000 miles of rivers and streams, and 3,200 miles of freshwater coastline provide abundant water-based recreation opportunities, making Michigan a great place to live and play while also supporting a thriving tourism industry. However, challenges and opportunities exist in sustaining and expanding the state's water-based recreational opportunities.

Improve Beach Health

Beaches are among the fondest memories of Michiganders' summer vacations. But pathogens such as *E. coli* threaten this treasured asset. The Great Lakes and inland public beaches are monitored for pathogens on a voluntary basis by local health departments, supported by MDEQ which awards grants for this purpose. In 2013, 98 beaches reported 162 incidents of *E. coli* exceeding accepted water quality standards, causing advisories or closures. While the durations were typically short, usually one or two days, any closure impacts recreation and tarnishes the state's image. Causes of beach contamination include releases from wastewater treatment plants, sewer overflows, leaking septic systems, runoff from agricultural operations, and excessive wildlife on beaches. These causes are addressed in other sections of the Water Strategy; however, additional real-time beach monitoring data is also needed to provide timely advisories that protect public health.

Recommendation

Expand the use of real-time monitoring and source tracking techniques at high-risk beaches by local health departments, counties, communities and universities and address sources of beach contamination.

Address Fish Consumption Advisories

Michigan continues to need guidelines on safe fish consumption amounts because of ongoing and historical deposition of persistent, bio-accumulative toxic (PBTs) pollutants like mercury, PCBs and banned pesticides such as DDT. Addressing sources of ongoing deposition and sites of legacy of contamination is critical to restore human use and enjoyment of fishery resources.

In some cases, global sources are contributing to atmospheric deposition of mercury and other PBTs and will require a state, regional and national approach to reduce emissions. Michigan's participation in national and regional efforts to eliminate anthropogenic mercury use and releases is critical to having an impact on this global problem. The MDEQ's 2008 Mercury Strategy report estimated most of the mercury released into the environment is released into the air, with a smaller amount being released directly to water and land. A 2002 inventory estimated about 7,000 pounds of mercury were emitted into the air in Michigan that year. About 37 percent was from coal combustion and about 30 percent was from the ¹purposeful use of mercury. This estimate has been used to establish a baseline for measuring progress toward reducing emissions. Between 2002 and 2011, ongoing pollution prevention activities, permitting and regulations resulted in mercury air emission reductions of 1,000 to 2,000 pounds of mercury. Coal-fired power plant retirements and use of additional coal combustion control equipment may eventually reduce mercury emissions in Michigan by 80 to 90 percent.

Although atmospheric deposition of Hg, PCBs and other PBTs cause most of the fish consumption advisories in Michigan, the most ²restrict advisories are caused by site specific legacy issues. Examples include the "do not eat" advisory covering all species of fish downstream of the former Velsicol site on the Pine River and covering all species of fish on the Kalamazoo River between Morrow Dam and Lake Allegan because of past practices at paper mills. Some restriction advisories have been successfully removed in Michigan's AOCs due to restoration efforts over the last several decades. The GLRI has enabled rapid progress toward restoring human uses of fishery resources. Sustained support for the GLRI is needed to continue progress.

Recommendation

Continue national and regional coordination of mercury reduction activities, such as implementation of the Great Lakes Mercury in Products Phase-Down Strategy and the Great Lakes Mercury Emission Reduction Strategy.

Ensure Sustainable Recreational Harbors

Michigan has more than 80 recreational harbors that contribute significantly to the quality of life and economic vitality of host communities. In addition, the harbors also help support Michigan's \$4 billion boating industry.⁸ Unfortunately, many harbors are in poor or failing condition and limited financial resources hamper sustainability.

The Department of Natural Resources completed an inventory and condition assessment of recreational harbor infrastructure in 2014. Additional research, planning and prioritization are needed to identify critical sources of sediment that diminish the value of the harbor and increase maintenance costs, prioritize long-term capital investment needs, and create strategies to market harbors.

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What does this mean? Use of mercury in industry/manufacturing? It needs to be clearer.

T Number: 2 Author: lcampbe Subject: Highlight Date: 6/4/2015 12:03:30 PM
should be "restrictive"

A multi-agency and university partnership is also conducting assessments to evaluate the complexity of the issues facing harbors while developing community guidance to ensure sustainability. Too often communities have not realized the full economic and social value of their harbors; rarely are they integrated into community and economic development plans. This integration is necessary for prioritizing and leveraging capital investments. Variable lake levels, infrastructure condition and depreciation, access, boating trends and future use of the harbor all need to be considered to ensure harbor and marina sustainability.

Recommendations

Prioritize infrastructure needs for repair and upgrade of public recreational harbors and their landside access.

Establish a harbor town program and improve marketing of harbors. The program should work with MDEQ to identify and address sources of upstream sediment, including sediment reduction and relocation strategies.

Increase Access to Lakes, Rivers and the Great Lakes

Since water plays such a pivotal role in many Michiganders' lives, access has always been a priority. In 1939, the Legislature first earmarked funds to purchase water frontage to improve access for fishing and boating. Since then, more than 1,200 public launching sites have been developed for boaters. The Natural Resource Trust Fund remains an important part of providing recreational opportunities, including access to Michigan's waters. But with more than 11,000 lakes and thousands of miles of rivers, streams and Great Lakes coastline, significant gaps in access remain. The 2013 Department of Natural Resources Managed Public Lands Strategy and the Great Lakes Water Trail Plan both recognized this need. Of course, protection of ecologically sensitive areas needs to remain foremost when addressing access gaps.

Recommendation

Work with local partners to provide public access every five miles on the Great Lakes, on all priority lakes more than 100 acres in size and every five miles on navigable water, as environmentally appropriate.

Designate Water Trails

Michigan has endless opportunities for establishing a spectacular water trail system. Much of the framework for such a system already exists, and some water trails have recently been developed on several rivers using existing access sites, harbors of refuge and waterside campsites. Statewide criteria for designating a trail is needed, including level of difficulty, distance between access sites, and trail amenities such as nearby campgrounds, restaurants and restrooms.

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Recommendation

Work with stakeholders to develop and implement a designated water trail system for inland waterways and along the coast.

Chapter 5: Promote Water-Based Economies

Goal: Michigan has a strategic focus on water technology and innovation to grow sustainable water-based economies.

Outcome: Policies and innovative technologies are developed and adopted to grow and promote sustainable water-based economies.

The Great Lakes, and Michigan's water in general, have played a defining role in the state's economy starting with fur trading and continuing with the lumber boom, agriculture, manufacturing and tourism. Michigan should leverage this past experience by marketing its strategic advantages as the Great Lakes state, growing leadership and harnessing talent in research and development, accelerating innovation in water technology, and optimizing water efficiency. Michigan and other places across the globe face complex challenges in addressing water quality and quantity concerns. The state is well-positioned to be a powerhouse for solving these complex problems and grow its economic opportunities around water in a manner that ensures good stewardship of the resource. Collaboration among industry, regulators, economic developers and academia directing water research and development is the right place to start.

Market Michigan's Strategic Advantages

Part of Michigan's appeal is its availability of freshwater and ability to manage water-related risks. Currently, Michigan hosts about 350 companies that provide technology, goods, and services related to the supply, treatment, distribution, storage, transport, recycling, rehabilitation and conservation of water. As a recent University Research Corridor analysis highlighted, more than one out of five jobs in the state are strongly linked to water, a number that does not include outdoor recreation and tourism, which alone contribute \$10 billion to the economy annually.⁹

The recognition of water as central to healthy systems, people and economies is growing. Electric utilities, mining, steel manufacturing, and the food and agricultural sector potentially face high costs as a result of water scarcity across the nation, due to the high capital costs for alternative supplies, reliance on a small number of assets and their relatively large volume of water use. Water-intensive companies in water-stressed areas are at the highest risk of experiencing production disruptions, stranded assets, increased capital costs and community conflicts over shared resources.

Water is a key factor in the economic health of many corporations and therefore a significant and knowable element in overall corporate stock price and volatility. In a 2015

survey, the World Economic Forum ranked water crises first as a critical risk to the global economy.¹⁰ According to a Pacific Vox survey of 50 Fortune 500 companies from a broad cross-section of industries nationwide, concern about water scarcity has grown dramatically during the past five years. By 2018, 86 percent of the companies expect to consider water availability in their site selection, up from 37 percent in 2008.¹¹

Water is now seen as a factor in the movement of trillions of dollars of capital and investment. Researchers, financial managers, investors and corporations are beginning to fully understand how water contributes to or mitigates risks throughout the business cycle. A key challenge that investors face is how to quantify and value financial risks from regulatory, physical and reputational impacts from water. The University of Michigan is conducting innovative research about water risk and corporate behavior, but further research is needed about the value the state's water resources can add to managing water-related risk, stock price volatility and overall financial performance.

Recommendation

Market the state's competitive advantage as a highly attractive place for business creation and investment because of our abundant natural water assets, water research capabilities, highly skilled talent, economic development expertise, and powerful tourism and business-marketing brand.

Optimize Efficient Use of Water in Business, Utilities and Municipalities

If Michigan's abundant clean water supply is efficiently managed, the state's economic capacity can grow while ensuring water stewardship. In a state with generally abundant water resources, it is difficult to appreciate that water is not disposable and that every drop is valuable. There are some areas of the state experiencing localized water scarcity, where this appreciation needs to spread across the state to ensure the sustainability of this precious resource. All Michiganders have an obligation to be good and thoughtful stewards of this global treasure by using water more thoughtfully and efficiently.

Under the Great Lakes Compact Agreement, each state is required to establish water conservation measures on each water use sector; however, limited data is available on current water use for each sector beyond gross numbers and anecdotal information. Without goals or objectives, we cannot evaluate progress in reducing water use impacts and determine if improvements are needed.

Nevertheless, some progress toward conservation is underway. Businesses are beginning to focus efforts around water sustainability to improve their bottom line and comply with environmental standards. Others are recognizing the importance of water globally and are beginning to work more holistically outside corporate walls. For example, Ford Motor Company, Consumers Energy, General Mills, Amway and Dow are all deeply engaged in

water management as part of their corporate sustainability and operational programs, many of which have set aggressive water efficiency targets. Consumers Energy set a water reduction target of 20 percent between 2012 and 2020. Ford Motor Company set a goal of reducing its water footprint by cutting the amount of water used per vehicle by 30 percent globally between 2009 and 2015.

The Great Lakes and St. Lawrence Cities Initiative (GLSLCI) also urged cities to participate in the GLSLCI Water Conservation Framework to help meet its commitment of reducing water use within city limits by 15 percent in total water usage by 2015 using 2009 water consumption levels as a baseline.

Conservation makes not just social sense, but business sense. Water is heavy, requiring a significant amount of energy to move through the system. Measureable water loss can be attributed to leaking and poorly maintained municipal infrastructure. In addition, cleaning and purifying water for drinking water, manufacturing and discharge is very costly. Nationally, between 4 percent and 13 percent of all energy is used to pump and treat water, for waste management, or for industrial and commercial processes.

For businesses and industries that require water use as a core part of their operations, energy (and cost) savings can happen in two ways: increasing the efficiency of pumping and treating water, or by reducing the total use of water per capita per industrial or municipal process. Capital asset management planning and infrastructure upgrades should reflect these goals.

Wastewater reuse through energy generation also provides economic opportunities. Innovative solutions to wastewater management can minimize water and energy footprints. Firms like Moore and Bruggink have reengineered Greenville's wastewater treatment facility to produce its own energy, reducing costs and energy consumption by more than 30 percent.

In addition to using less water through efficiency measures, water reuse should be explored in situations where potable water quality is not required and risk for cross-contamination is low. This must be done with critical attention to public health and infrastructure. Michigan should develop standards, protocols and strategies to protect public health and preserve surface water and groundwater resources while facilitating rain and grey water reuse in appropriate situations.

Recommendations

Establish voluntary water efficiency targets for all major water sectors to reduce water use impacts and costs.

Promote innovative technologies that reduce cost and water loss or convert waste products to usable materials.

Develop a water conservation and reuse strategy for the state that incorporates the use of green infrastructure, grey water systems and energy production and includes recognition programs.

Fund a pilot project, through a competitive bid process, for the initiation and evaluation of a new model for wastewater management. This pilot program will assess the opportunities and barriers to creating a "Water Resources Utility of the Future" focused on:

- *Reclaiming and reusing water*
- *Extracting and finding commercial uses for nutrients and other constituents*
- *Capturing waste heat and latent energy in biosolids and liquid streams*
- *Generating renewable energy using its land and other assets*
- *Using green infrastructure to manage stormwater and improve urban quality of life*

Optimize Efficient Use of Water for Agriculture

Agriculture is another example of a major water user in Michigan that has made significant advancements to improve efficiency. Water, energy and food are inextricably linked. Growing populations, improving technologies, high crop prices and specialty crops like seed corn have led to expansion of irrigation and agriculture production into regions of the state where it was once unfeasible. Biotechnology advances, especially shorter-season crop varieties, and climatological and meteorological changes with accompanying longer growing seasons make farming in the northern part of the state a more viable opportunity.

As agriculture continues to grow in Michigan, there will be greater pressure on aquifers and more potential for use conflicts. More intensive use of land will require greater management of water. While total agricultural water use is increasing, the efficiency of the transformation of water into crops is also increasing. There are opportunities for agriculture to use more sophisticated irrigation delivery and water management systems to reduce water use per unit output. Continued efforts to increase efficiency can reduce conflicts in localized areas that have water shortages, reduce related energy costs, and reduce water use impacts. There are many synergies and trade-offs between water and energy use and food production. The goal is not necessarily to reduce water use, but to reduce the impacts of agricultural water use on ecological systems and to use it more judiciously.

Aquaculture is another area that could thrive based on Michigan's plentiful water supply and high water quality. In a world demanding ever-increasing amounts of high-quality fish

and protein, growing the state's aquaculture industry will require significant innovation in water technology. In particular, industry and the state should continue to support ¹closed-loop or recirculating systems. Lowering energy costs of production, improving water filtration and strengthening supply chains for commercial aquaculture systems will enable the industry to grow substantially in an ecologically responsible fashion.

Efficient use of water also affects the processing and manufacturing supply chain. Companies like Kellogg, MillerCoors and General Mills are focusing efforts around water sustainability by working with the agricultural community to implement best practices, such as efficient delivery of water to crops, efficient use of water, and impact accountability. In areas with water scarcity issues like Texas, Colorado and other western states, technological advancements are reducing pressure on aquifers with inadequate recharge. Establishing targets for water efficiency in areas with localized water stress may reduce the potential for conflict.

Recommendation

²*Establish voluntary water efficiency targets for agriculture in areas of existing or potential water stress.*

Accelerate Innovation in Technologies to Solve Water Challenges

Michigan can advance the technology, science, research and education required to improve water management. These water technologies can be an economic driver for the state. To capture its share of the global water technology sector, predicted to reach \$1 trillion annually by 2020, Michigan must create an environment that fosters water entrepreneurs, supports a high-performing water technology sector, and leverages the state's innovation, research, development and manufacturing capabilities.

Michigan faces a number of complex challenges regarding water quality and quantity but the state also has a history of developing innovative water technologies to help meet those challenges while exporting those technologies to global markets. Different water sectors – municipal, agriculture, manufacturing and industry – all have specific needs requiring technological solutions such as maximizing water efficiency, minimizing water loss, meeting more rigorous discharge standards, and dealing with new forms of contamination from emerging chemicals and pharmaceutical products. Michigan has the ideas and research; academia, businesses, and end users need to align goals and desired outcomes for technologies to actually reach the market.

By building robust public-private partnerships, Michigan can link innovation, research and development, capital investment, entrepreneurialism, and end users to achieve desired environmental, economic and social outcomes. When an accelerator of public and private funding is combined, ideas can move more quickly from design to deployment and markets.

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This should say either "commercial aquaculture" without the qualifier of specific systems, or should say something like "new technologies and practices in aquaculture to protect water quality and maximize use efficiency." Limiting it to those two systems excludes the other types of aquaculture that the state is and should be supporting.

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Agriculture already has voluntary efficiency standards through the Irrigation GAAMP, and management tools to limit use through the WWAT Tool. Our policy opposes water allocation that would preempt riparian rights or attempts to limit efficient agricultural use. We can only support this recommendation if it says something like "Encourage compliance with the Irrigation Use and Efficiency GAAMP to maximize efficiency of water use."

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Recommendation

Create a strategic focus on water innovation to attract and accelerate new technologies to market through a business led council comprised of private investors, entrepreneurs, corporations, public agencies and universities to better manage water challenges in Michigan and worldwide.

Chapter 6: Invest in Water Infrastructure

Goal: Michigan invests in infrastructure and supports funding to maintain clean water and healthy aquatic ecosystems.

Outcome: People support investment of both public and private funding in Michigan's water resources.

The state's infrastructure – roads, commercial ports, drinking water systems, sewer systems, energy plants, transmission systems and recreational facilities – form the backbone of the economy. All water withdrawn from the Great Lakes, groundwater, rivers, and lakes for any purpose passes through some form of water infrastructure; it is a complex system. A functioning water infrastructure keeps the state running.

Improve Understanding of the True Cost of Water

Most people think of their monthly water bill as the cost they pay for water. But in reality, water, as a natural resource, is actually free for any purpose and for any amount used by any entity, public or private, as long as its use does not degrade the resource. Water is free to those who want water to drink, to businesses that use it in industrial processes, to those that bottle it for consumption and to homeowners who water their lawn. The economic value of water is nearly infinite, but for Michiganders it is a free, shared resource to use for all kinds of human purposes. While water as a resource may be free, there are costs associated with managing Michigan's water resources to ensure that water is of high quality and available for human uses.

Through their water bills, Michiganders instead pay for the infrastructure to deliver safe drinking water and carry away and treat waste, and for the operating costs, like energy, to treat and condition water and maintain infrastructure. Those outside the area of a municipal water supply system pay for well construction, treatment if necessary, the pump and the energy used to supply water to the tap. In addition, the cost of infrastructure to supply water is contained in the final price of all commodities and services.

Water's cost is determined by volume-based pricing that allows the collection of revenues to pay for infrastructure and operations used to deliver water. Under this scenario, there is often a lower per unit, usually gallons, fee on water for higher volume users and amounts. Water rates are commonly skewed in such a way that users pay less as volumes rise, because the price is pegged to infrastructure costs and not to the value of water itself. In some instances, this can act as a complicating factor when trying to achieve water use reduction or conservation, as conservation equates to lower revenues for municipalities.

A customer's use of less water does not necessarily or directly equate to lower operational costs of infrastructure. There is still a substantial cost to have safe drinking water delivered at adequate quantities and pressures whenever the tap is opened and to have fire protection available at the curb within the reach of a standard fire hose in event of an emergency.

Michigan has a long experience and legal history of not putting a commodity price on water, thus keeping water a free resource, and an important element of the state's economic and social well-being and stability. During public outreach for the Water Strategy, many residents suggested either putting a fee on water for all or some groups of water users – in its simplest form, a per gallon charge for water as it comes from the environment. Some suggested that only some types of water users, like agriculture, water bottlers or industrial users should pay a per gallon fee for withdrawing water. Others suggested all users should pay a surcharge or a per gallon fee for the use of water, regardless of user or purpose. Given that Michigan's citizens and businesses withdraw more than 4.2 trillion gallons per year, equivalent to the amount of precipitation that falls on the U.S. per day, even a tiny surcharge or access charge would add up quickly. The economic logic may make sense in the abstract, but it does not currently fit the culture and history of water and water use in the state.

Conversely, some argued that adding a price to water, even as an access charge versus a price on water per se, would commodify the resource, when it has historically been a public good or a public trust resource. Maintaining the ability to manage and ensure the sustainability of the water resources of Michigan and the Great Lakes is of utmost value to the state and the region, and even though a revenue stream could be created from a volume or access charge on water, the values potentially compromised under this scenario are too great to lose. However, there is still a compelling and growing need for investments in water and water infrastructure and for administrative and programmatic support in order for the state to meet its long-term vision for healthy, functional systems and prosperity.

To address the gap between actual investment need and public perception of that need, Michigan should launch a public education campaign to improve residents' understanding of the economic, environmental and social benefits of clean water, linking the investments necessary to achieve the benefits. If the public wants clean beaches and good water quality – and they say they do – public support of water infrastructure investments is critical. While we do not seek to facilitate a volumetric surcharge on water access, if that is something the public would ultimately support, then it would add to the options for funding long-term infrastructure and desired outcomes.

Water rates have historically been low and water both plentiful and affordable in most Michigan communities. Detroit's recent water shutoffs, the loss of urban population in other communities, and an overall increase in domestic water conservation has put a

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sharper focus on water rates, affordability, and the ability to continue to fund aging infrastructure costs. There is currently no statewide assessment of shut-off practices or policies that relate to affordability and water access for human use.

Recommendations

Implement a communication strategy focused on messages that link the relationship between investments in water infrastructure and clean water as well as the benefits infrastructure provides for drinking water, recreation, cultural and economic opportunity.

Utilize pricing and funding strategies to support infrastructure improvements while allowing for water conservation.

Evaluate current community practices regarding providing water to financially distressed customers to ensure all citizens have affordable access to water for drinking and sanitation.

Invest in Water Infrastructure

One of the biggest challenges facing communities is aging, deteriorating infrastructure systems with more operational needs than financial resources to meet them. Poor infrastructure degrades the value of water, results in costly efforts to mitigate impacts, and creates or increases drag on the economy.

In a perfect world, users of the system would pay for the cost of service. Rates would consider operation and maintenance costs as well as long-term capital investment needs. Unfortunately, rates in Michigan are typically set by elected officials who have political difficulty charging rates necessary to maintain infrastructures.

Asset management planning, performed properly, would support municipalities' efforts to optimize future costs and collect revenues sufficient to operate and maintain the system. Since 2013, some large municipal wastewater treatment plants have been required to develop an asset management plan as part of their nonpoint source discharge elimination standard (NPDES) permit; however, this requirement doesn't apply to all water utilities. Outcome-based asset management planning that includes more efficient use of resources can result in cost efficiencies that can be used to address capital costs while keeping rates affordable.

Communities can realize cost efficiencies to manage water infrastructure systems and to meet the needs of the future by increasing efficiencies in the delivery and treatment of water through implementation of energy efficiency measures, the use of technologies and a combination of grey and green infrastructure. A more integrated systems approach can improve water management, reduce energy costs and result in savings for communities as opposed to investing in traditional methods which typically have higher capital investment costs.

If communities continue to use traditional methods to manage infrastructure, conservative estimates range in the billions to improve stormwater, drinking water and wastewater management systems over the next 20 years. Although a large majority of these costs are not the responsibility of federal or state government, the state needs to implement a long-term strategy to sustain state water programs, including funding to maintain critical regulatory oversight programs, water quality monitoring and provide assistance to communities to local water infrastructure. In addition, the state should explore a variety of options to close the widening gap between existing funding sources and future revenues needs, including incentivizing asset management planning, state bonding and borrowing options, dedicated capital and trust funds, public-private partnerships, insurance and leveraging, private equity, and service area consolidation. Without adequate funding, Michigan's economy, aquatic ecosystems and quality of life will be diminished.

Recommendations

Incentivize and require outcome-based asset management planning for all public water utilities that includes more efficient use of resources.

Establish sustainable funding mechanisms to achieve Water Strategy goals including water infrastructure management.

Develop an Enterprise Budget for Water

The state needs to complete an enterprise budget to more fully understand the complex relationships between water, infrastructure needs and funding across all entities, including state agencies, federal agencies, local municipalities, drain commissioners and inter-county drain boards. An enterprise budget is a theoretical budget – not a responsibility budget – that portrays revenue and expenditures regardless of agency or governmental unit. The four principle revenue sources related to water in the state – federal, state and local revenues and fees, and private revenues – should be included in the enterprise budget as shown in Figure 2. This budget will also assist in understanding how to maximize the sustainability of the funds used to support water infrastructure and state programs.

Michigan – Statewide Enterprise Budget for Stormwater, Drinking Water and Wastewater Management

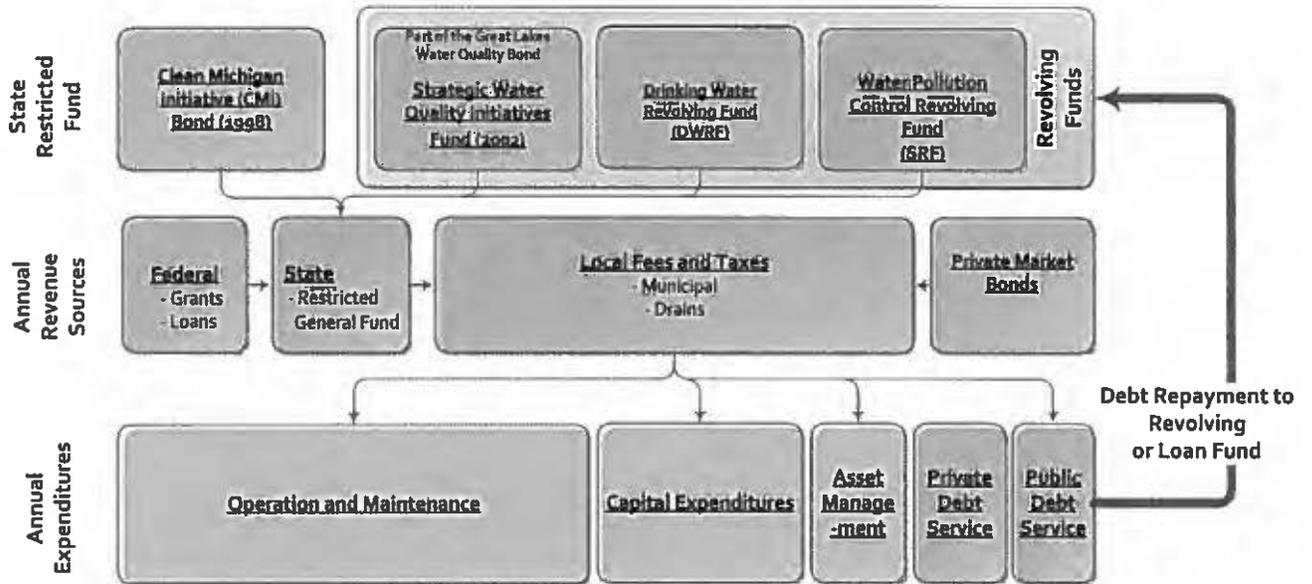


Figure 2: Statewide enterprise budget for stormwater, drinking water and wastewater.

Recommendation

Develop an “enterprise budget” to better understand the complex relationships between managing water, infrastructure needs and funding.

Chapter 7: Monitor Water Quality

Goal: Michigan has integrated outcome-based monitoring systems that support critical water-based decisions.

Outcome: Monitoring systems are in place at a scale and frequency to ensure water quality and quantity are maintained to support diverse uses and values.

Michigan's water presents undeniable economic growth opportunities, but appropriate monitoring to integrate economic, environmental, social and cultural data is critical to achieving this goal.

Michigan's current monitoring programs do not incorporate all components of the ecosystem and face significant funding challenges. Lack of systems-based monitoring approaches and inadequate data collection impede economic growth, detection of environmental and human health threats, and evaluation of program effectiveness. We must improve monitoring efforts and critically assess progress achieved across economic, ecological, social and cultural outcomes. The results should be used to determine how to best direct and connect management actions and future investments.

Build Integrated, Outcome-Based Monitoring Systems

Michigan needs to develop an integrated, water-based monitoring system that builds on collected data to create logical connections in an overall information system. This integrated system should include quality and quantity monitoring, condition assessment, modeling, and forecasting tools for the entire water cycle. It should be made publicly available and used by government and other organizations to better communicate the benefits of healthy water systems to residents and communities.

Monitoring practices have traditionally measured some, but not all, of the components of the ecosystem. It has narrowly focused on the ecological condition of fish, wildlife and water, compliance performance, and human health while placing less emphasis on outcomes related to system and economic performance, social and cultural impacts, and environmental factors.

In 2014, the University Research Corridor completed the first economic analysis that estimated the economic, social and cultural performance of water.¹² This approach is consistent with efforts undertaken by the Council of Great Lakes Governors and Premiers to develop systems-wide accounting and monitoring. A recent effort, called "Blue

Accounting,” seeks to integrate monitoring systems across ecological, use and social values at the Great Lakes scale. An integration of these components is shown in Figure 3.

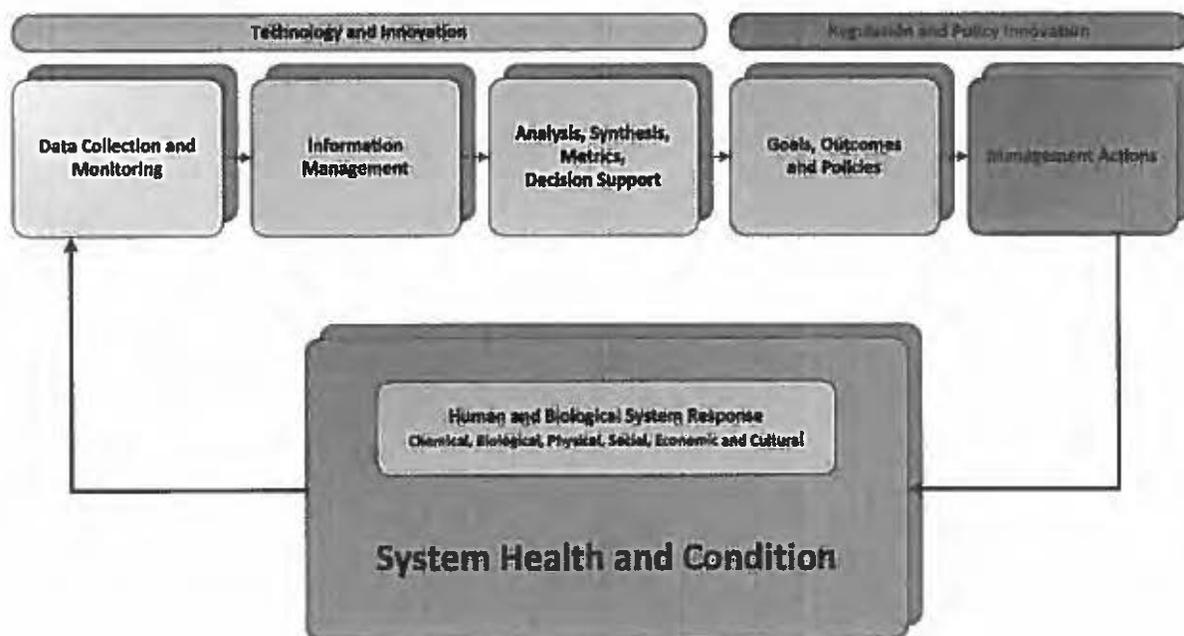


Figure 3. A schematic representation of an integrated system of monitoring and accounting.

Recommendation

Implement a pilot decision-support framework that includes monitoring, data and information, and analytical tools. This framework will assess ecological, economic, social and cultural values and outcomes at local and regional watershed scales.

Support Funding for Monitoring

Comprehensive monitoring of surface and groundwater is expensive and therefore typically funded piecemeal; however, if water quality is not maintained, public health, ecosystems, businesses and recreation suffer.

Michigan’s Surface Water Monitoring Strategy focuses on achieving four goals:

- Determine whether water quality standards are being met
- Measure water quality trends
- Evaluate the effectiveness of water programs
- Identify emerging water quality issues

The 1998 Clean Michigan Initiative (CMI), a \$675 million environmental and recreation bond, dedicated about \$3 million per year to surface water quality monitoring. This bond is nearly depleted, and an alternative, long-term, stable source of funding for surface water monitoring needs to be identified.

Some critical components of the Surface Water Monitoring Strategy are currently not adequately funded by CMI or any other funding source including stream flow monitoring and microbial health.¹³ Data that link microbial health to site-specific land use, wastewater management, manure management and hydrology are limited. For example, this information is critical for future management actions and investments such as how and when specific sources of *E. coli* trigger beach closures. In addition, better data management systems that include geospatial information are needed to enable integration of existing and new monitoring data at spatial scales.

Michigan lacks a coordinated and comprehensive strategy for monitoring groundwater quality and quantity to improve understanding of this valuable resource, reduce threats of contamination, and guide better investments and decisions. Monitoring and mapping the stores and flows of groundwater and use patterns to account for its use, removal from the environment, effects on aquatic systems, and its return to the environment is critical to understanding and ensuring sustainable use of groundwater resources.

The state needs to secure a long-term funding strategy for groundwater monitoring and management. Current efforts are funded and managed by an array of sources, resulting in fragmented monitoring approaches.

Recommendations

Develop a coordinated, comprehensive monitoring strategy for groundwater quantity and quality, including a data management system.

Develop a long-term, sustainable funding source for groundwater and surface water quality and quantity monitoring that is continually improved with new technologies.

Chapter 8: Build Governance Tools

Goal: Michigan has the governance tools to address water challenges and provide clean water and healthy aquatic ecosystems.

Outcome: Policies, organizational and institutional structures are in place to achieve the goals and outcomes of the strategy.

Water resource management in Michigan is facing increasingly complex problems that will require new and different knowledge and approaches that broaden participation in governance. Governance, as defined by Kooiman¹⁴, is “arrangements in which public and private actors work to solve societal problems, create societal opportunities, and design the societal institutions within which governing actions take place.”

Work led by Michigan State University in the late 2000s, *Critical Conversations about Environmental and Natural Resource Governance*¹⁵, concluded “A new model [of governance] may well require that individuals and groups beyond traditional state government structures play important roles in implementing management initiatives and monitoring outcomes.”

This work was informed through an extensive set of conversations facilitated by the MDEQ’s Environmental Advisory Council, which concluded that “Michigan will benefit from a new model of environmental and natural resource governance that benefits from collaborative efforts to develop agreed-upon outcomes, focuses on prioritization and relative public health/environmental risk, encourages innovation, provides for continuous improvement, promotes performance above minimal compliance, and engages voluntary environmental stewardship.”

This effort also concluded that what worked in the past to manage the environment might not be sufficient to address new and changing challenges with diminishing resources. This does not mean that old tools need to be discarded. Instead, the existing regulatory framework needs to be augmented alongside new tools and new approaches.

Facilitate Community-Based Dialogue and Water-Related Vision Development

The Strategy focuses on actions at the community level to develop vision, create collaborations and find local champions that can galvanize local unity. The ultimate goal is to marshal the financial and human resources to drive the vision ahead. Many regions and communities are already engaged in this important planning and implementation work, while others are just beginning. Through the community conversations conducted as part

of this strategy development and generously supported by the C.S. Mott Foundation (Appendix 2), communities are seeking help in two ways:

- Forming and designing their community vision relative to water and their water assets
- Identifying tools and resources to fulfill that vision

Community, regional and statewide foundations are central to supporting this effort. These organizations need to work together to support community planning around water. The state, through its grant-making capacity, collaborative programs, networks and outreach efforts, needs to support and augment these local efforts.

Recommendations

Enhance the understanding, knowledge and skill set of communities to facilitate and support community-based dialogue and water-related vision development.

Create a statewide Water Fellows Program and Network to build community leadership capacity and to inform critical leaders about how to leverage water resource assets to build community and economic vitality.

Align Resources, Tools and Regulatory Framework to Achieve Outcomes

Water resources are managed at various scales and by many levels of government. State-level regulations and policies establish performance expectations for managing important water and water-related resources. Great Lakes region-level regulations manage water diversions and flows and help prevent evasive species introductions such as Asian Carp through the Chicago Area Waterways System. Other regulations are national in scope.

Management of water resources at the local level is also important. Much of the state's rainfall and runoff is managed at the county and inter-county scale through county drain commissions and inter-county drainage districts. A thoughtful review of Michigan's existing tools, resources and regulatory framework for managing water at the local level is necessary to address emerging water problems that don't respond to traditional approaches methods. New approaches such as collaborative watershed governance may be needed to more effectively manage water across the landscape to achieve desired water quality and quantity outcomes. Partnerships, collaborative decision making and joint project implementation at the watershed scale that involve government, business, the building industry, agriculture, and environmental and other stakeholder organizations are a few examples of this approach.

Recommendation

Evaluate and implement necessary changes to laws including state and local land-use statutes as well as the drain code to create a more integrated, watershed based system for managing water at the landscape level and achieving water quantity and quality outcomes.

Retain Regulatory Tools

The state's water resources, as well as communities and businesses dependent on these resources, benefit from Michigan's authority to implement the provisions of the Clean Water Act, including Section 404 pertaining to wetlands and Section 402 pertaining to pollution control. Through state laws, Michigan maintains consistency with federal laws related to management of its wetland, lake and stream resources, and creates streamlined permitting systems to address Michigan-specific issues. Recent changes to several water resource laws have caused some to question whether Michigan's water resources would be "better off" if authority to regulate these resources was returned to the federal government. Others believe the cost for retaining federal authority is too great, but don't fully understand the cost to business for less permitting certainty and long processing times. Given that water and water resources are of critical and strategic importance to the state, it is in the state's long-term interest to exercise authority and autonomy over their thoughtful management.

Recommendation

Retain full authority under the Clean Water Act to continue to manage Michigan's own water resources.

Ensure the Water Strategy is Durable Over Time

The Water Strategy is not only about what government does or funds, but about what Michiganders do collectively to support healthy systems, human use and enjoyment, and a growing water economy. In order to ensure the Water Strategy is durable over time and across administrations, the elements of the Strategy need to be fully integrated into decision processes, governance structures, and the culture of state and local governments, other organizations, and individuals. Where Michigan places the nexus of responsibility for decision-making, whether on individuals, local governments or the state, matters. What goals residents and leaders focus on matters. How the state governs water quality, quantity and use matters.

Ensuring sustainability of the Water Strategy and its long-term implementation will depend on how the various recommendations get adopted by various actors or organizations and get funded, supported and realized. If the critical elements of this Strategy are not adopted and deeply engrained into ongoing decision-making processes, then little will come of them over time. Adaptive management approaches are needed to evaluate progress and make necessary course corrections to achieve desired outcomes.

Recommendation

Create an Interdepartmental Water Team to unite agencies to ensure a cohesive common strategy around implementation of the Water Strategy. The team will establish a process for stakeholder collaboration, criteria for setting implementation priorities, identifying cross-

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agency joint projects, and an approach to assess and evaluate progress achieved against the metrics and outcomes.

Chapter 9: Inspire Stewardship for Clean Water

Goal: Michigan citizens are stewards of clean water and healthy aquatic ecosystems.

Outcome: Individuals and communities understand their responsibility for and make responsible decisions regarding water resources.

Stewardship is about supporting and maintaining the things we hold dear and about our ability to create valued legacy and heritage. Throughout development of the Strategy, Michiganders said they care deeply about the Great Lakes, about rivers and inland lakes, and about water in general. Stewardship is also about the ability of that care to persist over time within the state’s communities and culture. It is one of the most important aspects of the Strategy, because it creates the backbone of our use and enjoyment of water in the state for generations.

Improve Water Literacy and Use of Place-Based Education

Michigan is blessed with abundant water resources, yet most citizens do not have a basic understanding of fundamental water literacy principles. During development of the Strategy, people across the state expressed the concern that many people do not know what a watershed is, or that they live in a watershed. As the Great Lakes state, Michigan should have water literacy principles as part of its K-12 curriculum standards.

Place-based education uses the elements of local community and environment as a starting point for teaching and learning, emphasizes hands-on, inquiry-based, real-world experiences, and, ideally, involves direct collaboration with community partners. This approach to education emphasizes the assets and context of the community and its place as part of a broader learning framework. The benefits of place-based education include powerful learning, a healthy, supportive school culture, sustainable partnerships between schools and communities a greater appreciation of the environment, and more frequent and effective acts of stewardship. Integrating freshwater systems into place-based educational experiences is critical to building literacy and stewardship for Michigan’s water resources.

Recommendations

Integrate water literacy principles into place-based education and State of Michigan curriculum standards tied to Science, Technology, Engineering and Math (STEM) principles across all grade levels.

Develop a survey tool to assess behaviors and attitudes toward Michigan's water resources to assess changes over time.

Increase Volunteerism and Community Engagement

One of the key aspects of stewardship within a community is whether residents are willing and able to volunteer their time to better their water resources. Communities that exhibit strong stewardship characteristics have more individuals and groups engaged with the community and tend to support measures that drive good water management practices, such as environmental cleanups and funding programs. The focus on building stewardship and care can thus translate directly into long-term benefits to the community and the state and heighten engagement.

Recommendation

Expand opportunities to engage citizen volunteers and participation, such as the Michigan Clean Water Corp (MiCorps) program, in gathering water quality and quantity data, in restoration, in providing access and in maintenance of important water-related resources.

T Number: 1 Author: lcampbe Subject: Highlight Date: 6/4/2015 12:11:28 PM
I think this should be "Corps"

Table 2. Water Strategy Implementation Plan

Goal 1: Michigan's aquatic ecosystems are healthy and functional.			
Outcome: Aquatic ecosystems are resilient and diverse.			
#	Recommendation	Implementation Metric	Lead Actor
1	Prevent the introduction of new aquatic invasive species and control existing populations of aquatic invasive species in accordance with the Michigan Aquatic Invasive Species Management Plan.	By 2020, the ecological separation of the Great Lakes basin and the Mississippi River basin, especially in the Chicago Area Waterways system has been initiated.	State and federal agencies, Nongovernmental organizations (NGOs), local units of governments, individuals
2	Work with other Great Lakes states and provinces to harmonize aquatic invasive species prevention, early detection processes and response actions across the Great Lakes region.	By 2016, implement a pilot project with Ontario and interested states to evaluate and pursue areas of harmonization.	State agencies
3	Accelerate research and solutions to identify mechanisms of food web disruption and changes of nutrient flows in the Great Lakes with a focus on the effects of invasive species.	By 2017, a minimum of three new research projects will be established for the purposes of evaluating nutrient shifts in Great Lakes food webs to help focus appropriate management, social, and economic responses.	Universities
4	Develop a strategy focused on improving the understanding of the causes of harmful algal blooms (HABs) to support strategic decisions on actions that can prevent HABs.	By 2017, develop a strategy to prevent HABs based on desired outcomes.	MDEQ, local public health departments
5	Develop harmful algal toxin water quality criteria and implement a real-time monitoring strategy for Michigan's Great Lakes drinking water intakes and public recreation locations threatened by harmful algae.	By 2020, increase by 20% the number of people served by drinking water suppliers using surface water sources with real-time monitoring equipment installed to provide early warning of potential public health threats. By 2020, develop harmful algal toxin assessment criteria. By 2020, implement a real-time monitoring strategy for Michigan's Great Lakes drinking water intakes and public recreation locations threatened by HABs.	MDEQ

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6	Support the development of a national drinking water advisory or action level target for harmful algal toxins.	Work with federal agencies to develop a national advisory target.	MDEQ
7	Incorporate planning for wet weather extremes and increased variability into state, regional and community planning.	Best management practices are reviewed every five years and updated (if necessary) to reflect climatic changes such as changes in rainfall frequency, duration or intensity.	State, regional governmental entities, communities
8	Provide technical assistance and develop technical tools and training programs for communities, local officials and water stakeholders to inform and improve their water literacy and help them integrate water impacts into local land use planning and decisions.	By 2020, develop a public official water literacy measurement. By 2020, develop a training module for local elected officials and decision-makers on the connection between land use planning and zoning and the siting and approval of new projects. By 2020, develop a training module for local elected officials and decision-makers on the merits and benefits of asset management planning.	Universities, regional government and planning organizations, MDEQ
9	Develop tools and guidance related to shoreline and riparian ecology and management and provide necessary technical support and training to municipalities, watershed-based organizations and landowners to achieve full benefits of riparian areas.	By 2020, develop a baseline for the current research and educational capacities. <ul style="list-style-type: none"> • Coordinate to pinpoint areas of capacity expansion. • Develop tools, guidance and training on best practices. • Determine need to update guidance and training materials. 	MDNR, MDEQ
10	Remove or improve dams that are no longer safe or ecologically, economically or socially viable to protect public safety and create healthy, connected aquatic systems.	By 2020, address all dams most at risk of failure.	MDEQ, MDNR
11	Focus river and stream restoration efforts on addressing small hydrological impediments like culverts to create connectivity and restore stream stability.	By 2020, increase the number of small hydrologic impediments that are restored over a baseline established in 2015.	NGOs and local units of governments
12	Refine and improve the water withdrawal assessment process to ensure sustainable use of water resources and that high priority is given to incorporating existing and new	By 2016, develop a list of priority Water Use Advisory Council recommendations and an implementation plan.	MDEQ, MDNR, MDARD

T Number: 1 Author: lcampbe Subject: Highlight Date: 6/4/2015 12:12:25 PM

Isn't DEQ supposed to come out with this list this summer? Should this recommendation say "2015" instead of "2016"?

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	data and models to better represent local and regional water resources and surface water/groundwater interactions.		
13	Provide technical and financial support to communities to plan and implement green infrastructure techniques and low-impact development while preserving natural spaces in the design of new developments, redevelopments and road projects to ensure storm water management and improve hydrology.	By 2020, increase the number of attendees to green infrastructure conferences, applications for projects, amount of grant dollars awarded to projects incorporating green infrastructure or low-impact development, and number of programs incentivizing green infrastructure projects and the number of Michigan communities that are recognized for green infrastructure projects and strategies over a baseline established in 2015.	MDEQ, MDOT, MDNR, Michigan State Housing Development Authority, MEDC
14	Modernize road and highway planning and infrastructure to effectively accommodate storm water runoff and infiltration needs, thereby reducing the costs and impacts of flooding.	By 2020, increase the number of Michigan's new road and highway projects designed to better accommodate storm water runoff and infiltration needs over a baseline established in 2015.	MDOT, local road and highway commissions
15	Enhance financial and technical support of local stakeholder efforts to develop and implement watershed management plans to restore impaired waters, protect high quality waters, and develop and utilize local water resource assets.	By 2018, increase the number of grants, training and educational opportunities on the development and implementation of watershed management plans over a baseline established in 2015.	MDEQ
16	Use existing authority to work with local units of government with storm water discharge or storm water-related hydrologic impairments in their waterways to establish Phase II storm water plans for impaired water bodies.	By 2020, increase the number of water bodies with storm water plans in place to address designated use impairments caused by storm water discharges and hydrologic impairments over a baseline established in 2015.	MDEQ, MDNR
17	Eliminate impairments in priority watersheds that have degraded water quality and/or aquatic ecosystems due to nutrient runoff and soil erosion. Engage landowners through a collaborative and adaptive community-based natural resource	By 2018, identify priority watersheds. Develop performance standards to cover statewide land use activities. Agricultural land use will directly follow MAEAP	MDEQ, MDARD

T Number: 1 Author: lcampbe Subject: Highlight Date: 6/4/2015 12:14:20 PM

Agriculture already has GAAMPs as performance standards for water and land use--why do we need this additional standard?

	<p>management process to identify local actions to change behaviors and solution to achieve those outcomes. Failure to achieve demonstrable outcomes within established timeframes could trigger additional measures.</p>	<p>¹ Guidelines and participation criteria to remain consistent with the state's recent efforts. Concurrently develop the escalated ² "additional actions" triggered once a watershed has been determined to be impaired.</p> <p>³ By 2018, develop regional action teams with protocols for working with landowners. Educate collaborative teams on existing regulations and enforcement mechanisms allowed in their regions.</p> <p>By 2020, collaborative processes are in place with plans to achieve water quality outcomes in priority watersheds.</p>	
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Goal 2: Michigan's water resources are clean and safe.

Outcome: Surface and groundwater are managed to support sustainable human uses and ecological function.

#	Recommendation	Implementation Metric	Lead Actor
1	<p>Protect drinking and source water areas by:</p> <ul style="list-style-type: none"> Continuing to ensure remediation activities address the long-term impact on drinking water sources; Identifying and diligently protecting source water protection areas; Assisting well owners with identifying potential water well vulnerabilities; Focusing resources on contamination sources with the highest potential for causing contamination of drinking water supplies, including chemical storage facilities; Enhancing the drinking water geographic information system database and making information available across MDEQ programs and to local public health department environmental health 	<p>By 2020, address IT security issues, such as firewall and server capacity, to make information publically available.</p> <p>By 2020, develop educational materials to encourage residents with private drinking water wells to test new wells prior to use for nitrates and arsenic and to test wells prior to sale or transfer for bacteria, nitrates and arsenic.</p> <p>By 2020, develop an interface to effectively and efficiently track and monitor for groundwater contamination, and implement data tracking.</p>	MDEQ, local health departments

T Number: 1 Author: lcampbe Subject: Highlight Date: 6/4/2015 12:16:25 PM

This is written like a mandate for implementing MAEAP. MAEAP is a voluntary program and we cannot support an implementation metric that requires its use.

T Number: 2 Author: lcampbe Subject: Highlight Date: 6/4/2015 12:17:25 PM

See our earlier comments; we cannot support a metric that calls for enforcement action here.

T Number: 3 Author: lcampbe Subject: Highlight Date: 6/4/2015 12:18:29 PM

This sounds very similar to the Regional Action Teams identified in the MAEAP statute. Why not address this metric to reactivate those teams rather than creating new ones?

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	<p>personnel; and</p> <ul style="list-style-type: none"> Supporting mapping of local groundwater conditions in partnership with well contractors and others who collect groundwater information. 		
2	Develop a plan for aquifer protection that addresses geothermal construction and proper abandonment of wells.	By 2016, convene a stakeholder work group to develop draft legislation to regulate closed-loop geothermal construction. By 2020, develop educational materials for community water systems and local health departments to increase plugging rates of abandoned wells when municipal water mains are extended.	MDEQ
3	Establish inspection requirements for residential wells, including testing wells for nitrates, bacteria and arsenic.	By 2020, implement a statewide requirement for periodic inspections of drinking water quality.	Legislature
4	Develop a spill and communication strategy and organize an incident command approach to prevent, prepare for and respond to environmental disasters and chemical releases.	By 2016, implement the pipeline strategy currently being developed under the leadership of MDEQ and the Attorney General.	MDEQ, MDNR, MDARD, Michigan State Police, Department of Technology, Management and Budget
5	Develop and implement a uniform statewide sanitary code that is flexible and provides standards for site suitability based on risk. Establish a long-term, sustainable funding source to support onsite wastewater programs at the state and local levels and to assist financially distressed owners of private on-site wastewater systems with repair and replacement costs.	By 2020, every county health department has an inventory and assessment of private, single-family home water supplies and all septic systems. By 2020, secure a long-term funding source to complete the inventory and to assist distressed owners.	Legislature
6	Establish inspection requirements for residential on-site wastewater systems.	By 2020, implement a statewide requirement for periodic inspections of on-site septic system performance for properties with on-site wastewater systems.	Legislature
7	Develop marketing and education campaigns and outreach tools directed at homeowners' on-site wastewater management and maintenance and funding opportunities to assist with repair and	By 2020, increase the number of entities implementing outreach campaigns directed at homeowners on septic	NGOs, local units of government,

T Number: 1 Author: lcampbe Subject: Highlight Date: 6/4/2015 12:19:25 PM

Didn't DEQ do this in 2014 as part of their stakeholder discussion on proposed Part 127 changes? Should this say "continue" instead of "convene"?

	replacement.	management.	
8	Secure a long-term funding source to accelerate the cleanup of legacy contaminated sites.	By 2027, close and remove 7,500 sites from the 201 Facilities Inventory, National Priority List, Leaking Underground Storage Tank Site database and designated Areas of Concern.	Legislature
9	Pass comprehensive legislation phasing out the use and sale of microbeads in Michigan.	By 2017, comprehensive legislation phasing out the use and sale of microbeads is signed into law.	Legislature
10	Establish research priorities for “emerging pollutants of concern” in partnership with Michigan’s research universities to: <ul style="list-style-type: none"> • Better understand potential ecological and human health impacts • Adapt monitoring protocols to detect concentrations, fate and transport • Recommend standards for protection of human health and the environment • Develop technologies to remove such pollutants from manufacturing processes 	By 2016, increase the number of evaluations and risk assessments completed, new standards developed, and monitoring protocols developed.	MDEQ, Michigan Department of Community Health
Goal 3: Michigan communities use water as a strategic asset for community and economic development.			
Outcome: Economic and community development plans and efforts fully leverage water assets to create great places to live, work and play.			
#	Recommendation	Implementation Metric	Lead Actor
1	Emphasize water resources as assets in state, regional and community planning efforts to provide appropriate, sustainable protection and to fully leverage community-based economic opportunities.	Increase ¹ walkability score of waterfront communities to measure the effect of economic activity and investment on or near water in a community, watershed or region.	MSDHA, MEDC, MDEQ, MDNR regional governments, local units of government
2	Host an annual mayor’s summit focused on creating high-quality communities that leverage strategic water assets.	Increase in property values as a result of increased economic activity and investment on or near water in a community, watershed or region.	Mayors
3	Provide in-depth technical assistance to support communities with developing and	Increase in the number of communities participating in	Regional and

What is the support for walkability score being an effective proxy for economic investment in water assets?

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	implementing community visions and strategies for waterfront redevelopment, access and use.	Redevelopment Ready Communities Program.	interagency teams
4	Prioritize investments around strategic economic assets of commercial harbors and long-term, sustainable infrastructure.	By 2020, increase the percentage of commercial traffic and other economic activity at Michigan's commercial ports over a baseline established in 2015.	MDOT, MDNR, MDEQ's Office of the Great Lakes, Governor's Office of Public-Private Partnerships, commercial maritime interests, local planning professionals

Goal 4: Michigan's water resources support quality recreation and cultural opportunities.

Outcome: Waters of the state are world renowned for recreational pursuits such as hunting, fishing, boating and swimming.

#	Recommendation	Implementation Metric	Lead Actor
1	Expand the use of real-time monitoring and source tracking techniques at high risk beaches by local health departments, counties, communities and universities, and address sources of beach contamination.	By 2020, all of Michigan's water meets total and partial body contact designated uses with no closures or advisories. Real time monitoring at all high-risk beaches.	MDEQ, local health departments, local units of government, universities
2	Continue national and regional coordination of mercury reduction activities, such as implementation of the Great Lakes Mercury in Products Phase-Down Strategy and the Great Lakes Mercury Emission Reduction Strategy.	Reduce the mercury levels in edible portions of Great Lakes, inland lakes and stream fish to below 0.35 parts per million by 2020.	MDEQ, MDCH
3	Prioritize infrastructure needs for repair and upgrade of public recreational harbors and their landside access.	By 2020, increase the number of recreational harbors with asset management plans over a baseline established in 2015.	MDNR, Waterways Commission, MDEQ, MDOT
4	Establish a harbor town program and improve marketing of harbors. The program should work with MDEQ to address sources of upstream sediment, sediment reduction and relocation strategies.	By 2017, establish a harbor town program.	MDNR
5	Work with local partners to provide public access every five miles on the Great Lakes, on all priority lakes over 100 acres in size and on every five miles of navigable water, as environmentally appropriate.	Public access every five miles on the Great Lakes and on all priority inland lakes larger than 100 acres.	MDNR

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6	Work with stakeholders to develop and implement a designated water trail system for inland waterways and along the coast.	By 2020, a designated a water trail system has been established by the MDNR.	MDNR, local units of governments, , NGOs
Goal 5: Michigan has a strategic focus on water technology and innovation to grow sustainable water-based economies.			
Outcome: Policies and innovative technologies are developed and adopted to grow and promote sustainable water-based economies.			
#	Recommendation	Implementation Metric	Lead Actor
1	Market the state's competitive advantage as a highly attractive place for business creation and investment because of our abundant natural water assets, water research capabilities, highly skilled talent, economic development expertise, and powerful tourism and business-marketing brand.	Increase the number of water-dependent companies and investments locating in Michigan. Specifically track aquaculture technology and related opportunities.	MEDC
2	Establish voluntary water efficiency targets for all major water sectors to reduce water use impacts and costs.	By 2020, develop a baseline for water usage, data collection and definitions to inform development of water conservation goals and objectives. Collect data for two years. Increase by 20% the number of businesses, industries, and municipalities with water efficiency within their water management plans.	Water use sectors
3	Promote innovative technologies that reduce cost and water loss, or convert waste products to usable materials.	By 2020, increase the number of new, innovative and cost-effective technologies, pilot projects, and startups are commercialized, come to market and result in connections with end users to reduce costs and water consumption, or convert waste products to usable materials and produce energy over a baseline established in 2015.	MDEQ, MDARD, MEDC
4	Develop a water conservation and reuse strategy for the state that incorporates the use of green infrastructure, grey water systems, and energy production that includes recognition programs.	By 2018, develop a water conservation and reuse strategy.	MDEQ, MDARD, MDOT

T Number: 1 Author: lcampbe Subject: Highlight Date: 6/4/2015 12:21:56 PM

Doesn't DEQ already collect annual water use data from all municipalities and large quantity industrial users? Why not use that data?

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5	<p>Fund a pilot project, through a competitive bid process, for the initiation and evaluation of a new model for wastewater management. This pilot program will assess the opportunities and barriers to creating a "Water Resources Utility of the Future," focused on:</p> <ul style="list-style-type: none"> • Reclaiming and reusing water • Extracting and finding commercial uses for nutrients and other constituents • Capturing waste heat and latent energy in biosolids and liquid streams • Generating renewable energy using its land and other assets • Using green infrastructure to manage storm water and improve urban quality of life 	By 2017, pilot project is funded.	Legislature
6	<p>¹ Establish voluntary water efficiency targets for agriculture in areas of existing or potential water stress.</p>	<p>² By 2017, develop a baseline for water usage, data collection and definitions to inform development of water conservation goals and objectives in areas of existing or potential water stress. Collect data for two years. ³ Establish targets. Increase in the number of water stressed regions that have water efficiency plans and water efficiency targets by 2020.</p>	MDARD
7	<p>Create a strategic focus on water innovation to attract and accelerate new technologies to market through a business-led council comprised of private investors, entrepreneurs, corporations, public agencies and universities to better manage water challenges in Michigan and worldwide.</p>	<p>By 2020, increase the number of new, innovative and cost effective technologies, pilot projects, and startups that are commercialized, come to market and result in connections with end users to solve water problems over a baseline established in 2015.</p>	MDEQ, MEDC, MDNR, MDARD

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- T** Number: 1 Author: lcampbe Subject: Highlight Date: 6/4/2015 12:22:57 PM
See our earlier comments; we cannot support targets for water use--this would need to say something like "Encourage the use of the Irrigation Use and Efficiency GAAMP to maximize water use efficiency."
-
- T** Number: 2 Author: lcampbe Subject: Highlight Date: 6/4/2015 12:23:24 PM
Water use data is already collected by MDARD--why not use that data?
-
- T** Number: 3 Author: lcampbe Subject: Highlight Date: 6/4/2015 12:24:41 PM
See our earlier comments--we cannot support an implementation metric that calls for water targets. We would encourage use of the Irrigation GAAMP to maximize water use efficiency, since limits on use are already managed by the WWAT tool.

Goal 6: Michigan invests in infrastructure and supports funding to maintain clean water and healthy aquatic ecosystems.			
Outcome: People support investment of both public and private funding of Michigan water resources.			
#	Recommendation	Implementation Metric	Lead Actor
1	Implement a communication strategy focused on messages that link the relationship between investments in water infrastructure and clean water and the benefits infrastructure provides for drinking water, recreation, and cultural and economic opportunity.	By 2017, implement a communication strategy focused on connecting economic, environmental, social and cultural values to Water Strategy outcomes.	NGOs, MDEQ, MDCH
2	Utilize pricing and funding strategies to support infrastructure improvements while allowing for water conservation.	By 2020, increase the number of communities that have pricing and funding strategies as part of their asset management plans to support infrastructure improvements over a baseline established in 2015.	Local units of government, water utilities
3	Evaluate current community practices regarding providing water to financially distressed customers to ensure all citizens have affordable access to water for drinking and sanitation.	By 2017, increase the number of communities that have practices in place to ensure financially distressed customers have access to water for drinking and sanitation over a baseline established in 2015.	Local units of government, water utilities
4	Incentivize and require outcome-based asset management planning for all public water utilities that includes more efficient use of resources.	By 2020, require all major NPDES-permitted dischargers to develop and implement asset management planning for each system. By 2020, require all municipal community water suppliers serving more than 1,000 people to develop and implement asset management planning for each system.	MDEQ
5	Establish sustainable funding mechanisms to achieve the Water Strategy goals including water infrastructure management.	By 2020, implement a long-term funding strategy to achieve goals of the Water Strategy and support existing Quality of Life Agency programs and policies.	State agencies, Legislature

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6	Develop an "enterprise budget" in order to better understand the complex relationships between managing water, infrastructure needs and funding	By 2016, develop an enterprise budget for water to inform the long-term funding strategy.	MDEQ
Goal 7: Michigan has integrated outcome-based monitoring systems that support critical water-based decisions.			
Outcome: Monitoring systems are in place at a scale and frequency to ensure water quality and quantity are maintained to support diverse uses and values.			
#	Recommendation	Implementation Metric	Lead Actor
1	Implement a pilot decision support framework that includes monitoring; data and information; and analytical tools for assessing ecological, economic, social and cultural values and outcomes at local and regional watershed scales.	By 2017, fund and implement a water resource decision support framework that provides information about the integration of ecological, economic, social and cultural values and outcomes.	MDEQ, MDNR, MDCH, MDARD
2	Develop a coordinated, comprehensive monitoring strategy for groundwater quantity and quality, including a data management system.	By 2018, implement a long-term groundwater monitoring strategy that provides information sufficient to assess status and trends in quality and predict impacts from groundwater withdrawal.	MDEQ
3	Develop a long-term, sustainable funding source for groundwater and surface water quality and quantity monitoring that is continually improved with new technologies.	By 2018, fund and implement surface water and groundwater monitoring strategies that provide information sufficient to assess water quality and quantity status and trends, and detect emerging issues.	Legislature
Goal 8: Michigan has the governance tools to address water challenges and provide clean water and healthy aquatic ecosystems.			
Outcome: Policies, organizational and institutional structures are in place to achieve goals and outcomes of the Strategy.			
#	Recommendation	Implementation Metric	Lead Actor
1	Enhance the understanding, knowledge and skill set of communities to facilitate and support community-based dialogue and water-related vision development.	By 2016, work with community foundations and private foundations to support community-based dialogues.	Community and private foundations

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Is this meant to integrate with the WWAT? The Water Use Advisory Council recommended this, so it would be best to try to incorporate those as coordinated rather than separate efforts.

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2	Create a statewide Water Fellows Program and Network to build community leadership and inform critical leaders about how to leverage water resource assets to build community and economic vitality.	By 2016, establish and implement a Water Fellows Program.	Private philanthropy
3	Evaluate and implement necessary changes to laws including state and local land-use statutes as well as the Michigan Drain Code to create a more integrated, watershed based system for managing water at the landscape level and achieving water quantity and quality outcomes.	By 2016, create an ad hoc external advisory body to evaluate existing laws and statues including the Drain Code and local land use statutes. By 2018, panel should provide recommendations to the Directors.	MDEQ and MDARD Directors
4	Retain full authority under the Clean Water Act to continue to manage Michigan’s own water resources.	Continue assumption of federal programs under the Clean Water Act.	MDEQ
5	Create an Interdepartmental Water Team to unite agencies to ensure a cohesive common strategy around implementation of the Water Strategy. The team will establish a process for stakeholder collaboration, criteria for setting implementation priorities, identifying cross agency joint projects and an approach to assess and evaluate progress achieved against the metrics and outcomes.	By 2015, create interdepartmental water team. By 2015, put a working agreement in place to establish implementation priorities, a process for stakeholder collaboration, and an adaptive management approach to evaluate progress achieved against metrics and outcomes.	MDEQ, MDNR, MDARD and MEDC Directors
Goal 9: Michigan citizens are stewards of clean water and healthy aquatic ecosystems.			
Outcome: Individuals and communities understand their responsibility for and make informed and responsible decisions regarding water resources.			
#	Recommendation	Implementation Metric	Lead Actor
1	Integrate water literacy principles into place-based education and state of Michigan curriculum standards tied to Science, Technology, Engineering and Math (STEM) across all grade levels.	By 2016, develop a strategy to integrate freshwater literacy principles into place-based education and state curriculum standards.	MDEQ, MDNR and Department of Education, State Board of Education
2	Develop a survey tool to assess behaviors and attitudes toward Michigan’s water resources to assess changes over time.	By 2016, develop a Gant chart that encompasses all implementation activity timelines. Develop clear metrics about stewardship related to: <ul style="list-style-type: none"> • Ability to fund water quality infrastructure • Measuring the community’s 	MDEQ, MDNR, Universities

		<p>connection to local water assets</p> <ul style="list-style-type: none"> • Knowledge of, and affinity for, local waters • Metrics of volunteerism and local philanthropy that support a community's vision for water and water-related assets • Measuring actual progress versus planned 	
3	<p>Expand opportunities to engage citizen volunteers and participation, such as the Michigan Clean Water Corp (MI Corps) program, in gathering water quality and quantity data, in restoration, providing access and maintenance of important water-related resources.</p>	<p>By 2016, develop a list of participants and define engagement levels. Track progress toward increasing engagement levels.</p>	<p>MDEQ, MDNR</p>

I think this should be "Corps"

Table 3: Other Recommendations Identified During the Development Process

Goal 1: Michigan’s aquatic ecosystems are healthy and functional.		
Outcome: Aquatic ecosystems are resilient and diverse.		
#	Recommendation	Lead Actor
1	Conduct research to assess natural and social systems that comprise Michigan’s Great Lakes shorelands. Include patterns of shoreline development, coastal wetland habitats, beach structures, local revenues generated from shoreland development, and use and costs incurred from development. Determine the taxpayer (public) versus insurance (private) burden of coastal damage and flooding scenarios.	Universities
2	Develop a detailed toolbox of options to provide long-term funding for storm water management, including providing support for the creation of storm water utilities.	Michigan Municipal League
3	Develop a database and conduct a statewide inventory of county and inter-county drains as well as public road and highway-dedicated drainage, including maintenance intervals and associated costs.	MDARD, drain commissioners, county road agencies, MDOT, MDEQ
4	Enhance the efforts initiated by the state parks system to incorporate green infrastructure within design and operations plans for state-owned properties like parks, roadways, prisons and schools.	DTMB
5	Develop the “Healthy Waters, Working Farms: For Future Generation Initiative,” a pilot public-private partnership and locally led effort to protect farmland and address water quality, farmland preservation, and fish and wildlife habitat through a system of permanent easements and a network of conservation practices on private working lands in areas with high-priority water quality concerns.	MDEQ, MDARD, NGOs
Goal 2: Michigan’s water resources are clean and safe.		
Outcome: Surface and groundwater are managed to support sustainable human uses and ecological function.		
#	Recommendation	Lead Actor
1	Promote USDA rural development funding to high-priority areas with high rates of septic system failure to replace or to maintain old septic systems or provide resources to connect to public wastewater treatment systems, if available.	MDARD
2	Establish a non-federal funding mechanism to leverage federal Great Lakes Legacy Act funds to continue the remediation of contaminated sediments in Areas of Concern by 2018.	Legislature
3	Provide water supply intake locations and information to environmental response companies upon request, and notify communities and drinking water plants that may be impacted by spills.	Legislature, MDEQ

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4	Require decentralized wastewater treatment systems be included in planning for state funding of wastewater infrastructure improvements and extensions.	MDEQ, Legislature
Goal 3: Michigan communities use water as a strategic asset for community and economic development.		
Outcome: Economic and community development plans and efforts fully leverage water assets to create great places to live, work and play.		
#	Recommendation	Lead Actor
1	Ensure common water resources and adjacent land resources are managed in harmonious ways in communities and regions through coordination and collaboration to protect water resources while facilitating waterway-appropriate public use, commercial and amenity development, and recreation.	Local units of government, Regional governmental entities
Goal 4: Michigan communities use water as a strategic asset for community and economic development.		
Outcome: Waters of the state are world renowned for recreational pursuits such as hunting, fishing, boating and swimming.		
#	Recommendation	Lead Actor
1	Implement recommendations developed in partnership with Michigan Sea Grant, National Weather Service, the Great Lakes Research Center at Michigan Technological University and others to improve information for beachgoers on wave conditions and dangerous near-shore currents. Information should be available and accessible at beaches through a variety of media, including smart devices.	MDNR, MDEQ, local units of government
2	Complete the state's harbor of refuge system.	MDNR
3	Invest in innovative and technological advancements to lower the cost and frequency of dredging.	U.S. Army Corp of Engineers
Goal 5: Michigan has a strategic focus on water technology and innovation to grow sustainable water-based economies.		
Outcome: Policies and innovative technologies are developed and adopted to grow and promote sustainable water-based economies.		
#	Recommendation	Lead Actor
1	Researchers should seek funding to extend research and quantification of the risk profile water plays in corporate profitability and performance volatility. Differentiate the state and the Great Lakes from other regions of the country for financial managers and investors.	Universities
2	Expand the University Research Corridor's inventory of Michigan's water-related industries to include other water-related sectors, such as tourism and recreation, and conduct an inventory of water research projects at Michigan universities to further define and identify the scope of Michigan's water sector.	Universities

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3	Direct funding of studies conducted through the Agriculture Partnership Wastewater Workgroup to develop new technologies and best management practices to address tile lines and water management, and pilot and evaluate the adoption of innovative methods for nutrient management from tile line discharges. Existing institutional structures should be used to connect end users with technologies to ensure implementation of effective water management techniques and technologies.	MDARD
4	Create a coordinated public-private program of education and incentives to promote efficient use and conservation of water.	MDEQ, MDCH
5	Collaborate with the National Science Foundation International to set a framework for gray water and water reuse applications to protect public health and minimize risk. Modify applicable building and plumbing codes to allow for the adoption of water reuse strategies.	MDEQ, MDARD, MDCH
6	<p>Use all available tools and create new ones, including existing and new funding opportunities, to attract technology providers to address specific water quality and quantity issues, and develop strategies to connect end users with technologies. Incentivize and invest in areas including but not limited to:</p> <ul style="list-style-type: none"> • Increasing technology innovation capacity in the application of rapid response E. coli testing for surface waters • Developing a market to attract innovative technology developers for low-cost, environmentally sound sediment remediation, sediment removal, reuse and disposal • Developing low-cost methods of remediating pollutants that falls outside of traditional regulatory system • Researching treatment technologies to prevent introduction and spread of invasive species by ballast water • Developing technology to address special challenges facing food processors • Developing technology to address water issues associated with fracking • Developing technology to further improve green infrastructure design and maximize infiltration capacity and/or water retention • Increasing technology innovation capacity in treatment technologies to reduce phosphorus loading from municipal systems • Developing efficient technologies to remove and separate nitrogen and phosphorus through permeable membranes for use in anaerobic digestion • Increasing technology and innovation that addresses the intersection of energy, water and food systems • Increasing energy efficiency and water quality recirculation systems for aquaculture and aquaponics for urban, closed-cycle food production systems • Developing technologies to enable higher efficiency water delivery systems and water conservation, including work on advanced drain tile management systems 	MDEQ, MEDC, MDARD, MDNR

Goal 7: Michigan invests in infrastructure and supports funding to maintain clean water and healthy aquatic ecosystems.		
Outcome: People support investment of both public and private funding of Michigan water resources.		
#	Recommendation	Lead Actor
1	Continue to advocate for Great Lakes Restoration Initiative funding and other federal programs that support the Great Lakes.	State agencies, NGOs, Local units of government
Goal 9: Michigan citizens are stewards of clean water and healthy aquatic ecosystems.		
Outcome: Individuals and communities understand their responsibility for and make informed and responsible decisions regarding resources.		
#	Recommendation	Lead Actor
1	Coordinate, deliver and support ongoing freshwater-focused professional development for Michigan’s K-12 educators. Convene statewide summer seminars for Michigan K-12 educators where best practices in teaching core environmental education concepts can be refined and shared.	Nonprofit organizations

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Definitions and Acronyms

AIS - Aquatic Invasive Species - An invasive species is defined as a species that is not native and whose introduction causes, or is likely to cause, economic or environmental harm or harm to human health.

AOC - Areas of Concern - Are federally designated places where numerous uses of the areas (fishing, swimming, hunting, drinking water) have been impaired due to historical contamination.

CAWS - Chicago Area Waterways System

CMI - Clean Michigan Initiative

DDT - A commonly used pesticide (Dichlorodiphenyltrichloroethane) that was banned in 1972 that has contributed to fish consumption advisories in the Great Lakes ecosystem.

MDEQ - Michigan Department of Environmental Quality

MDNR - Michigan Department of Natural Resources

Ecosystem - The complex set of relationships among living resources and their habitat

Evapotranspiration - How water is transferred from land to the atmosphere by evaporation from the soil and transpiration from plants.

Food web - The system of interlocking and interdependent food chains

4 R Nutrient Stewardship Program - A program that provides a framework to achieve cropping system goals, such as increased production, increase farmer profitability, enhanced environmental and improved sustainability. To achieve those goals, the 4R concept incorporates the Right fertilizer source, Right rate at the Right time and in the Right place.

Great Lakes - St. Lawrence River Water Resource Compact Agreement - An Agreement amongst the eight Great Lakes states as well as Ontario and Quebec to protect against wholesale diversions of water from the Great Lakes basin.

GLITTH - Great Lakes International Trade and Transport Hub

GLRI - Great Lakes Restoration Initiative

GLSLCI - Great Lakes and St. Lawrence Cities Initiative

Grey water - The relatively clean water from sinks, baths, and washing machines.

HAB – Harmful Algal Bloom - Algal blooms that produce concentrations of harmful toxins such as blue green algae or cyanobacteria.

Impaired waters – Under section 303(d) of the Clean Water Act, states, territories, and authorized tribes are required to develop lists of impaired waters. These are waters that are too polluted or otherwise degraded to meet the water quality standards set by states, territories, or authorized tribes.

Implementation metric – A tactical metric to measure progress toward accomplishing the recommendation.

MAEAP - The Michigan Agriculture Environmental Assessment Program is an innovative, proactive, and voluntary program that helps farms of all sizes and all commodities voluntarily prevent or minimize agricultural pollution risks administered by the Michigan Department of Agriculture.

MDARD – Michigan Department of Agriculture and Rural Development

Measures of Success – A measure of the improvement in environment, social or economic conditions overtime as a result of multiple actions.

MEDC – Michigan Economic Development Corporation

Nonindigenous - Fish or wildlife not native to a place.

NPDES – The National Pollutant Discharge Elimination System (NPDES) permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States.

Outcomes - The desired final end results.

PCB - Polychlorinated Bi-Phenyl

PBT – Persistent Bio-accumulative Toxin

URC - University Research Corridor - The formally created research cooperative comprised of the University of Michigan, Michigan State University and Wayne State University.

U.S. EPA – United States Environmental Protection Agency

Appendix 1

Water literacy principles - The understanding of water's influence on the individual and the individual's influence on water. An example of a water literacy principle is that bodies of fresh water are connected to each other and to the world.

WHO – World Health Organization

WLEB - Western Lake Erie Basin

Development Process and Engagement Strategy

To develop the Water Strategy, the OGL formed an interagency steering committee that included representatives from the MDEQ, MDARD, DNR and MEDC. The steering committee met throughout the development of the Strategy to brainstorm, evaluate recommendations, and review content and direction. Additionally, the Michigan State Housing Development Authority (MHSDA) and the MI Place Partnership Initiative helped develop and refine ideas about water and placemaking.

An additional, external advisory committee, called the Water Cabinet, informed the Strategy's broad goals and developed a set of long-term desired environmental, economic, social and cultural outcomes. The cabinet consisted of a diverse array of 25 individuals actively engaged in ensuring the long-term health, function and resiliency of Michigan's water resources and in encouraging and nurturing its economic and cultural values.

In order to reflect diverse public perspectives, the OGL also led an extensive public engagement effort, integrated tribal involvement and engagement, and invited a series of 10 experts to develop white papers providing key insights on solutions for emerging and challenging problems that Michigan faces related to its water resources.

The OGL also hosted "Water Dialogues" with 16 communities across the state, focused on understanding different communities' capacity to create and implement a vision for water resources. These facilitated conversations, supported by a grant from the C.S. Mott Foundation, helped develop implementation tactics for the Strategy, reinforce the themes and refine the focus of the Strategy.

The draft goals and outcomes were tested at 10 regional economic roundtable discussions to understand how current local and regional economic development efforts depend on water. These discussions ultimately contributed to the development of a suite of themes reflected in the Strategy.

Finally, the OGL made a concentrated effort to encourage broad public involvement and awareness of the draft Strategy. Outreach efforts included press releases, website postings, the State of the Great Lakes report, presentations, an informational Webinar, and 30-day public comment opportunities via the Website.

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Michigan's Water Strategy Economic Regional Roundtable Discussion Summary

Background

During 2013, the OGL hosted Economic Regional Roundtable Discussions in each of the 10 Michigan Prosperity Regions in collaboration with the Michigan Department of Natural Resources, Michigan Department of Agriculture and Rural Development, and the Michigan Economic Development Corporation. The purpose of the economic roundtables was to discuss how local and regional economic development efforts currently depend on water and related resources, and to hear and understand how the participants feel these needs and opportunities will evolve in the future. In addition, OGL gathered input on the draft Water Strategy goals, outcomes, and regional and statewide issues. The discussions were held in Marquette, Traverse City, Gaylord, Grand Rapids, Saginaw, Flint, Lansing, Battle Creek, Adrian and Detroit. Please refer to Appendix A to see the list of participants.

With the help of local contacts, OGL invited roughly 25 economic and community development leaders actively engaged in water-related projects and issues to each discussion. Attendees reflected perspectives from academia, agriculture, business, industry, economic and community development, tribal nations, conservation, environmental, fishing, hunting, harbors, public health, local units of government, planning, philanthropy, recreation, and tourism.

Summary of Key Themes

Each economic roundtable was a three-hour discussion focused on economic development and water at the regional scale. Participants provided feedback on the goals and outcomes and brought forward several themes and ideas that should be reflected in the Water Strategy. Below is the summary of these key themes.

Michigan's available freshwater resources will become increasingly valuable as water resources become scarcer nationally and globally. Attendees were asked how their region's dependence on water will evolve during the next 30 years. Responses tended to focus on Michigan's abundance of the natural resource and the increasing value of water around the world. Participants felt that Michigan will become a more attractive place to live, work and play because of the availability of fresh water and opportunities for growing business and recreational opportunities. Participants recognized that groundwater recharge, water reuse and monitoring of water resources would become increasingly important in the future.

Michigan has the opportunity to become a leader in research and development of freshwater technologies. Participants identified a need for investments in the development of technology focused on protecting and restoring Michigan's water resources as well as helping address global water issues. They highlighted collaboration among business, industry, government and universities as a way to capitalize on water technology, innovation, research and development. Michigan's leadership in technologies would increase Michigan's economic capacity and would encourage others to look to the state for guidance on water issues.

Education of leaders and citizens about basic water principles is important to inform wise decision making and drive water-related stewardship. There was consensus among participants that the public needs to understand how to protect and care for the resource and must have the desire to do so. The public, legislators and youth must be educated about basic water principles and the hydrologic cycle to make educated and wise decisions. Participants recognized the need for storytelling about the evolution of water challenges in Michigan, progress made to address these challenges, and successes to increase stewardship of the resource. More place-based education is needed to build a sense of place, stronger connections to the resource and stewardship of water.

Public access to water resources was viewed as an important opportunity for economic development and improving quality of life. Some regions were very concerned that their lack of public access points inhibited economic development. Increased public access was also viewed as a way to connect people to the resource and nurture stewardship.

Marketing strategies should place a stronger emphasis on water assets and placemaking to attract talent, economic development and tourism. Participants agreed that marketing efforts could be better utilized on a regional scale to leverage unique assets within the state. Strategies that promote high-quality, water-based job opportunities; high quality of life amenities; and water-based recreational opportunities can attract youth and talented workers.

Balancing economic growth and environmental protection was identified as challenge for many regions. Demands for increased agricultural and industrial uses create challenges for protecting water resources. Growing economic capacity is dependent on the ability to maintain infrastructure and the health of our ecosystem.

Access to clean, affordable drinking water was important to most regions of the state.

The importance of the land and water interface needs to be recognized in planning and decision making. Planning, infrastructure, agriculture and other economic decisions must be made with an understanding of the impact on water resources. Watershed planning, infrastructure investments, and community and economic development planning need to be connected.

Investment in infrastructure maintenance and management was repeatedly expressed as a priority to the regions. Most areas had infrastructure that was 50-60 years old and needed more investment in the development of sustainable, green infrastructure.

Failing septic systems need to be addressed to protect water quality and public health. Participants were concerned with the public's lack of knowledge about septic system maintenance. Many failing septic systems could be addressed through public education about appropriate maintenance, as well as through local and state regulations such as point-of-sale inspections or the establishment of a statewide sanitary septic code.

Policies, regulations, investments and resources must be aligned and integrated at all levels to achieve regional and local goals. Many participants were concerned with how the Strategy aligned with other existing plans, compacts and policies and with how the state would ensure sustainability of the Strategy. The impacts of state policies and regulations on the implementation of community development and economic development plans needs to be better understood at the local level. In some cases, regulations at the regional or state level were noted as a barrier to implementation. Participants emphasized that planning and resolution of issues were best addressed at the local level.

Conflicts around water

OGL asked participants to discuss areas of water-related conflict, particularly those occurring in their region. Many participants identified the lack of knowledge or understanding of water issues and the causes of the issue as one source of conflict. Water issues were sometimes extremely complex and participants felt that decisions were sometimes made without a full understanding or adequate information about the problem and its causes. Further, conflict is often caused by a lack of alignment in policies and decision-making among different groups working on related issues. The impact of industry, agriculture and groundwater extraction on the integrity of the water resource was a source of conflict in regions with higher concentrations of industry or groundwater contamination. The responsibility of stormwater management was also a source of conflict in urban areas.

The conversation then focused on conflicts that may arise in the future and common organizations that assist with conflict resolution. Examples of future conflicts included

groundwater withdrawals, allocation of funding and resources, and the competing uses of water for agriculture, industry and recreation. Most conflicts, participants thought, originated with a lack of knowledge about the issue and a lack of a consistent and/or accepted conflict-resolution method. Groups mentioned as trusted agents to resolve conflict included Michigan State University Extension, DEQ and DNR. While all of the regions varied on their current capacity to resolve conflict locally, most participants agreed that conflict resolution should lie at the community level. Communities need to develop the capacity to resolve conflict and collaborate at the local level.

Collaboration

OGL also asked participants if they saw any areas of potential collaboration to achieve the proposed goals and outcomes of the Strategy. In almost all of the regions, participants saw DEQ as a facilitator to assist in effective collaboration at the local level. They identified a strong culture of collaboration at the state, regional and community levels as necessary to achieving the Water Strategy's goals and outcomes. The creation and communication of a unifying vision statement in the Strategy would help guide communities. Diverse interest groups should work together using appropriate tools and resources to solve problems. Participants recognized opportunities to be more inclusive at the community level when working to come up with solutions. Furthermore, they recognized the large role agriculture and industry play in water usage without being brought in to the decision-making process.

Funding and resources

Participants also offered input on how the funding system should be structured to ensure capacity to fund the vital priorities that will be reflected in the Strategy. Financing and resource capacity was noted as critical to the achievement of the water strategy goals and outcomes. Some suggestions for raising funds included a charge for groundwater use, a rain tax or fee, and monetary incentives to encourage local funding. Regions also indicated that funds should come from a mix of public and private entities.

Regional Uniqueness

The economic roundtables were also intended to provide the OGL with an understanding of whether regional needs and opportunities around water were reflected in the draft goals and outcomes of the Strategy. Participants at regional meetings were asked how their region uniquely depends on water currently and in the future. In addition, participants were asked if their region's needs and opportunities around water were reflected in the draft water strategy goals and outcomes. The following sections highlight this regional distinctiveness from the participants' perspectives.

Region 1: Marquette

Participants highlighted the Upper Peninsula's unique water resources define the region and play an important role in its economy, including three Great Lakes watersheds, desirable state parks and high quality waters. A key theme expressed by the region was that economic activity has become much more diverse in the last decade in this region. In addition to the developed mining industry, tourism, fishing and paper industries have become increasingly important. About 30 percent of the region's economic base comes from the high abundance of raw materials that are available to these industries.

Participants in the Upper Peninsula expressed the importance of protecting pristine waters to prevent the need for remediation. High water quality and quantity was seen as vital to future economic development. To ensure thoughtful decision-making, they identified education of the public and young people on water and watershed principles as a priority. The group also noted an opportunity to better market the Upper Peninsula's water resources, state parks and other recreational opportunities in order to increase tourism and attract and retain young people.

Region 2: Traverse City

High quality water is extremely important to the Northwest Lower Peninsula because of growing recreational activities like kayaking, boating and swimming. However, this area faces some unique challenges with managing swimmer's itch in inland lakes and concerns about hydraulic fracturing. The region is also uniquely characterized by its strong leadership in planning and community development. Industrial features were purposefully placed in areas that would not be disruptive to the beauty or public use of natural resources.

The group anticipated the need to improve infrastructure management in order to handle the expansion of second homes, extreme weather and changes in water levels. Participants identified opportunities for water reuse and conservation in industrial use through the development of water technologies. Jobs related to this technology development were also seen as an avenue to attract and retain young talent.

Region 3: Gaylord

Northeast Michigan is uniquely characterized by an abundance of cold-water streams and rivers. More specifically, Otsego County is home to five major, pristine, cold-water river systems. Additionally, the group identified the growth of wild rice in inland lakes and commercial fishing on Lake Huron as important aspects of the region's culture. The group identified groundwater contamination and swimmer's itch on inland lakes as important issues of concern.

Tourism is an opportunity for future economic development in the region. Greater marketing of the region's abundant cold waters, shipwrecks, and fishing and boating recreational activities is needed to increase and attract visitors. Increasing local awareness of the value of the surrounding natural resources as well as educating the public and officials on land and water connections was important to participants. In addition, preserving Northeast Michigan's wetlands, high quality surface waters, and the quality and quantity of groundwater for drinking water will be important for future economic development and ecological health in the region.

Region 4: Grand Rapids

Participants saw high public access to water, the presence of five of the state's largest rivers, and higher population density as West Michigan's unique characteristics. Region 4 is self-sufficient on conflict management and has a unique culture of collaboration and innovation. Issues unique to West Michigan included: legacy contamination of the Kalamazoo River, which could become the largest superfund site in the U.S.; sewer overflows; impervious surfaces; and storm water management.

The group saw public education on the increasing value of water, water literacy principles, land and water connections, and individual impact on the resources as an important need. Further, they saw creating a culture of consciousness about water stewardship and sustainability as opportunities. The group also mentioned the need to involve a broader audience of diverse interest groups in the region's decision-making process. Another key theme expressed by Region 4 was the opportunity to expand the role of agriculture and industry in order to meet increasing demands for food and water in the future.

Region 5: Saginaw

Participants identified a world-class walleye fishery, a large coastal wetland system and the natural features of Saginaw Bay as characteristics unique to Region 5. However, the group mentioned that use of these resources for recreation is limited due to lack of public access. Saginaw is distinct from other northern Michigan regions because there is major focus on restoration of natural resources. Agribusiness was identified as a major sector in the bay area with major effect on water quality and use. Other issues identified included population loss, runoff into the bay and old infrastructure.

There was strong support to expand the bay region's tourism industry through the creation of increased accessibility to the bay, waterfront lodging, a casino, bird trails, and the cleanup of eutrophication and muck issues. The group noted that building a pier would improve visibility of the bay from the ground, and the creation of more boat and kayak launches would allow people to easily reach well-known fishing locations. Changing public perception by telling the story of improvements in water quality as a result of the

tremendous amount of work is important. Educating the public was noted as a regional need in order to create stewardship of the resource and to ensure that people focus on solving the right problems.

Region 6: Flint

The Flint group noted the region's longstanding focus on water from its dependence on the lumber, fur, automobile, manufacturing and agriculture industries. More recently, the city began to orient the community around the waterfront. Unique recreational characteristics Region 6 highlighted included bird trails, undeveloped and developed beaches, boating, fishing, and hunting. Regionally specific issues include old infrastructure on the water and traffic on the main roads.

Region 6 participants focused on the opportunity to market the area as a weekend vacation destination to recapture dollars locally instead of sending them "up north." More developed public access points, bird trails and the cleanup of old vacant industrial sites were mentioned as ways to build recreational desirability. Older infrastructure and groundwater contamination were mentioned as regionally specific issues.

Region 7: Lansing/Bath

The Lansing area saw its region as unique because of limited access to either inland lakes or the Great Lakes. This lack of abundant water features has spurred more careful stormwater management and restoration of the region's limited water resources. Further, the group mentioned that while there are some recreational activities such as swimming, kayaking and golfing, agriculture and industry dominate the region's water use. Groundwater was important to the region and was expected to grow in importance in the future.

Region 7 wanted to more effectively capitalize on water-related assets and recreational opportunities by improving quality and access to the resource. Partnerships with the universities presented opportunities to lead in the innovative solutions to maintain water in the system and protect groundwater as a source of drinking water. The group highlighted stormwater management and water reuse as major opportunities to retain water. Region 7 also noted that there are opportunities to encourage and expand innovative approaches to drive sustainability through better regulations, voluntary programs and market forces.

Region 8: Battle Creek

A key theme expressed in Southwest Michigan as a unique differentiator for the region is its dependence on agriculture. The region accounts for 70 percent of the state's irrigation, including more than 300,000 irrigated acres. Seed corn production is the major crop, but the group also mentioned that Berrien County is the second-most diverse agricultural

county in the nation because of the soils and climate. Another unique aspect emphasized in Region 8 is waterfront redevelopment opportunities that were previously neglected.

The group saw high agriculture capacity as an opportunity to address growing global food demand. The group also indicated that there is potential to market the region's recreational opportunities to increase tourism. Southwest Michigan identified the need to address contamination issues first, before removing dams, reconnecting rivers and promoting recreational opportunities. Participants also expressed a desire to improve public perceptions about water quality and educate citizens and public officials on land and water connections to ensure responsible decision-making.

Region 9: Adrian

Region 9's karst geology was identified as a major influencer of water quality unique from other parts of Michigan. The group also indicated that the region contains headwaters for many of Michigan's major rivers. Additionally, participants noted that their watershed hosts many acres of agriculture as well as artesian wells in Monroe County and parks. One other distinctive characteristic in Region 9 is a high rate of population growth and conversion of seasonal housing to year-round living.

The group emphasized the importance of addressing algae blooms in Lake Erie because they affect tourism, fisheries and water supplies. Additionally, continuing restoration initiatives like increasing river access was identified as a way to encourage economic development. Other opportunities mentioned included university engagement with water development research, attracting young professionals by reorienting communities around water resources, and increasing recreational opportunities through the development of more canoe and kayak rentals and water trails.

Region 10: Detroit

Unique regional attributes discussed included old infrastructure, an industry-driven economy, a number of universities, a dense population with a higher demand for water, a world-class fishery and a large port. The group also noted that there is limited public access to the water in Detroit and that the riverfront is underutilized. They saw Lake St. Clair's large boating and fishing industries as major recreational components of the region.

Southeast Michigan's universities were identified as having exceptional collaboration around the water sciences, creating an opportunity for the region and the state to become a leader in freshwater technologies. Stormwater and wastewater management were emphasized as potential beneficiaries of such research. Other opportunities for Southeast Michigan expressed by the group included capitalizing on unused capacity in existing infrastructure and increasing access to and marketing of the region's natural water assets for recreational use.

Feedback on Goals and Outcomes

To help attendees understand the Water Strategy's goals and outcomes, regional participants were asked to vote on the draft outcomes, choosing those that most closely reflected their region's priorities around water. Following the voting exercise, each region discussed which outcomes were selected and why. The outcomes were revisited later in the session and participants were asked if, based on the conversation, their region's views and priorities were reflected in the drafted outcomes. Participants were asked what they felt was missing from the drafted list, and were provided an opportunity to propose new outcomes. Please refer to Appendix B to review the goals and outcomes that were shared with the groups.

Voting and reflection on outcomes. The following outcomes were selected most often as priorities throughout the regions:

- Drinking water is safe and available
- Water infrastructure is well-designed and maintained to support recreational, economic, and cultural uses and values
- Groundwater is managed for human uses and environmental integrity
- Leaders at all levels support investment of both public and private funding in Michigan's water resources, reflecting individuals' value of a connection between a healthy environment, strong economy, and high quality of life

The following outcomes were selected least often as a regional priority:

- Great Lakes and inland beaches are safe for swimming
- Coastal and shoreline areas and infrastructure are compatible with ecological function and human use
- Aquatic life is managed for the resilience of aquatic ecosystem function and diversity
- Management practices recognize the land-water and hydrologic connections

Generally, participants commented that the outcomes selected least often had a more narrow focus than the ones that were most often selected. Additionally, prevention of invasive species, management through the utilization of a watershed approach and better conservation of water were issues that several participants wanted to see explicitly expressed in the outcomes. Newly proposed outcomes that received the most votes focused on funding and stewardship of the resource.

Overall, each of the regions noted that their main views and priorities were reflected in the goals and outcomes. The gaps or missing themes identified by participants were generally issues or threats to water resources, such as climate change and invasive species

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management, and are more programmatic or tactical, given that they illustrate the way in which to get to a desired state or condition.

Appendix A: List of Roundtable Attendees

Economic Development Region 1

September 17, 2013 - Marquette

Northern Michigan University

Carl Lindquist, Superior Watershed Partnership

Ron Sundell, Northern Michigan University

James Cantrill, Northern Michigan University

Caralee Swanberg, Lake Superior Community Partnership

Gary LaPlant, Community Foundation of the Upper Peninsula

Karl Zueger, City of Marquette

Dr. David Watkins, Michigan Technological University

Ally Dale, Marquette County Conservation District

Jon Fosgitt, Compass Land Consultants

Dave Anderson, Copperwood Project

Phil Musser, Keweenaw Economic Development Alliance

Scott Gischia, Cleveland Cliffs

Curt Goodman, City of Marquette

Brent Ketzenberger, Cleveland Cliffs

Stacy Welling Haughey, MDNR

Steve Casey, MDEQ

JR Richardson, Traxys Power

Economic Development Region 2

September 25, 2013 – Traverse City

Northwest Michigan Works!

Megan Olds, Grand Traverse Regional Land Conservancy

Scott Gest, Northwest Michigan Council of Governments

John Sych, Grand Traverse County

Joseph H. Elliott, Grand Traverse Conservation District

Kevin McElyea, Grand Traverse County Drain Commissioner

Cindy Ruzack, Rotary Charities of Traverse City

Sarah U'Ren, Watershed Center Grand Traverse Bay

Amy Beyer, Conservation Resource Alliance

Treenen Sturman, Grand Traverse Conservation District

Tad Peacock, Benzie Conservation District

Hans VanSumeren, Northwestern Michigan College

Mark Breederland, Michigan Sea Grant

Trudy Galla, Leelanau County Planning

Dan Vogler, Michigan Aquaculture Association

Chuck May, Great Lakes Small Harbor Coalition

Greg Goudy, MDEQ

Brian Jankowski, MDEQ

Steve Hammon, Traverse City Golf and Country Club

Jim MacInnes, Owner of Crystal Mountain

Emily Myerson, Top of Michigan Trails Council

Jason Jones, Grand Traverse County Parks and Recreation

Don Coe, Michigan Department of Agriculture and Rural Development Commission

Tino Breithaupt, MEDC

Economic Development Region 3

September 24, 2013 – Gaylord

University Center

Curtis Chambers, Cheboygan County

Brad Jensen, Huron Pines

Lisha Ramsdell, Huron Pines

Jeff Ratcliffe, Otsego County Economic Alliance

John Walters, Pigeon River Country Advisory Council

Wayne R. Jonker, Kalkaska County Drain Commissioner

Dana Bensinger, Otsego County Community Foundation

Rick Harland, Grayling Charter Township

Craig Cotterman, Denton Township Supervisor

Vicki Springstead, Higgins Lake Foundation

Anne Meeks, Higgins Lake Foundation

Mark Copeland, Jay's Sporting Goods

Dawn Bodnar, Indian River Chamber of
Commerce
Grenetta Thommasey, Tip of the Mitt
Watershed Council
Robert Dixon, Grayling Township
Dave Waltz, Au Sable River Watershed
Restoration Committee
Richard Deuell, Northeast Michigan Council of
Governments
Lydia Murray, MEDC
Jeff Gray, Thunder Bay Marine Sanctuary

Economic Development Region 4

November 25, 2013 – Grand Rapids

DeVos Place

Mark Knudsen, Ottawa County Planner
April Scholtz, West Michigan Land
Conservancy
Bill Byl, Kent County Drain Commission
Brad Boomstra, Kent County Drain
Commission
Felicia Fairchild, Saugatuck and Douglas
Convention and Visitors Bureau
David Rinard, Steelcase
Gabe Wing, Herman Miller
Kevin Larsen, H2Opportunities
Bob Kennedy, Commission Chair
Jonathon Jarosz, Heart of the Lakes
Gail Heffner, Calvin College/Plaster Creek
Stewards
Nichol Demol, Trout Unlimited
Rick Chapla, The Right Place
Ed Garner, Muskegon Area First
Michelle Skedgell, Pierce Cedar Creek
Institute
Dr. Hugh Brown, Pierce Cedar Creek
Institute
Bonnie Hildreth, Barry Community
Foundation
Patty Birkholz, League of Conservation
Voters
Andy Guy, Governor Rick Snyder's Office of
Urban Initiatives
Jan Urban Lurain, Spectra Data and
Research
Jason Ball, Kuntzsch Business Services

Travis Williams, Outdoor Discovery Center
Macatawa Greenway
Mike Wenkel, Potato Growers of Michigan
Inc
Kara Wood, City of Grand Rapids
Rachel Hood, West Michigan Environmental
Action Council
Vicki Luthy, Muskegon Public Health
Department

Economic Development Region 5

October 3, 2013 – Saginaw

Saginaw Valley State University

Michael Kelly, Saginaw Bay Watershed
Initiative Network

Dane Cramer, Ducks Unlimited
Carl Osentoski, Huron County Economic
Development Corporation

Kimberly Mason, City of Saginaw

Trevor Edmonds, Saginaw Basin Land
Conservancy

Dennis Zimmerman, Saginaw Bay Area of
Concern

Zachary Branigan, Saginaw Basin Land
Conservancy

Russ Beaubien, Spicer Group

David Karpovich, Saginaw Valley State
University, Saginaw Bay Environmental
Science Institute

Shirley Roberts, BaySail

Jane Fitzpatrick, East Michigan Council of
Governments

Paul Strpko, Fisher Companies

Ray VanDriessche, Michigan Sugar Company

Tim Boring, Michigan State University
Extension

Laura Ogar, Bay County Environmental
Affairs and Community Development

Patti Stowell, Bay City Economic

Development Corporation

Dr. Donald Uzarski, Institute for Great Lakes
Research

Julie Spencer, Gratiot Conservation District
Administrator

Trevor Keyes, Bay Future

Sheila Stamris, City of Frankenmuth

Downtown Development Authority

Carey Pauquette, Saginaw Chippewa Indian Tribe
Michael Fisher, Saginaw Chippewa Indian Tribe
Peter W. Little, Gratiot County Parks and Recreation
Harry Leaver, Saginaw Valley State University, Center for Business & Economic Development
Bob Zeilinger, Cass River Greenways Committee
Joel Strasz, Bay County Health Department
Joseph Rivet, Bay County Drain Commissioner
Donald Schurr, Greater Gratiot Development
Scott Walker, Midland Tomorrow
Jennifer Humphries, MDARD

Economic Development Region 6

October 11, 2013 – Flint

Flint and Genesee Chamber of Commerce

Joe Stock, Lapeer County
Chris Bunch, Six Rivers Land Conservancy
Randy Maiers, St. Clair Community Foundation
Janice Karcher, Genesee Regional Chamber of Commerce
Doug Weiland, Genesee County Land Bank Authority
Mark Brochu, St. Clair County Parks & Recreation
Lori Eschenburg, Metropolitan Planning Commission
Jumana Vasi, Charles Stewart Mott Foundation
Mary Bohling, Michigan Sea Grant
Jason Hami, City of Marysville
Daugherty Johnson, City of Flint
Greg Alexander, Sanilac County Drain Commissioner
Janet VandeWinkle, Flint River Corridor Alliance
Jason Caya, Flint Area Reinvestment Office
Nadine Thor, Kettering University
Rafael Turner, Flint and Genesee Chamber of Commerce
Derek Bradshaw, Genesee County Metropolitan Planning

Danielle Lewinski, Center for Community Progress (Flint)
Tom Raymond, Lexington Village Manager
Rebecca Fedewa, Flint River Watershed Coalition
Steve Trecha, Integrated Strategies
Justin Sprague, Genesee Chamber of Commerce
Sheri Faust, Friends of the St. Clair River and Health Department
Marci Fogal, Blue Water Area Convention and Visitors Bureau
Jack Stock, Kettering University
Michael Freeman, Flint River Corridor Alliance
Amy McMillan, Genesee County Parks and Recreation
Justin Horvath, Shiawassee Economic Development Partnership

Economic Development Region 7

October 25, 2013 – Lansing

Bengel Wildlife Conservancy

Eric Pessel, Barry-Eaton Health Department
Liesl Eichler Clark, 5 Lakes Energy
James Byrum, Michigan Agri-Business Association
Michelle Napier-Dunning, Michigan Food & Farming Systems
Doug Buhler, Michigan State University, Michigan Agricultural Experiment Station
Sandy Gower, Ingham County Economic Development Corporation
Brad Garmon, Michigan Environmental Council
Brian Burroughs, Trout Unlimited
Laura Campbell, Michigan Farm Bureau
John Warbach, Michigan State University Land Policy Institute
Phil Hanes, Clinton County Drain Commission
Joseph Mion, Golder Associates
Phil Korson, Michigan Cherry Committee
Meghan Swain, Michigan Association for Local Public Health
Bill Maier, Board of Water and Light
Garrett Johnson, Michigan Nature Association
Tim Boring, Michigan Soybean Association

Regina Young, Barry-Eaton Health
Department
Jim Zook, Corn Marketing Program of
Michigan
James Byrum, Michigan Agri-Business
Association
Abigail Walls, Michigan Forest Products
Council

Economic Development Region 8

October 7, 2013 – Battle Creek

W. K. Kellogg Foundation

Tracy Bronson, Calhoun Conservation District
Ken Masumoto, Ken Masumoto Resources
Peter Terlouw, Southwest Michigan Land
Conservancy
Dawn Dye, Calhoun County Visitors Bureau
Michael McCuiston, Edward Lowe
Foundation
Robert Whitesides, Kalamazoo River
Watershed Council
Robert Mason, Post Foods
Angela Myers, Battle Creek Community
Foundation
Marcy Colclough, Southwest Michigan
Planning Commission
Christine Hilton, City of Battle Creek Planning
& Community Development
Ken Kohs, City of Battle Creek - Utilities
Director
Lyndon Kelley, Michigan State University
Extension
Joan Bowman, Global Food Protection
Institute
Kelly Clarke, Kalamazoo County Land Bank
Authority
John Gruchot, Berrien County

Economic Development Region 9

November 6, 2013 – Adrian

Lenawee Now

Dan Stefanski, River Raisin Area of Concern
Charles Londo, City of Luna Pier
Amy Torres, Jackson County Enterprise
Group
Evan Pratt, Washtenaw County Water
Resources Commissioner

Brian Jonckheere, Livingston County Water
Resources Commissioner
Pamela McConeghy, Brighton Greater
Chamber
Grant Bauman, Region 2 Planning
Commission
Susan Smith, Economic Development
Partnership of Hillsdale County
Christine Bowman, Hillsdale County Chamber
of Commerce
Christie Cook, Community Action Agency
Shelby Bollwahn, Michigan State University
Extension
Tim Lake, Monroe County Business
Development Corporation
Ned Birkey, County of Monroe
Christopher Miller, City of Adrian
Martin Marshall, Lenawee County
James Van Doren, Lenawee Now
Jim Frey, Resource Recycling Systems
Richard Micka, River Raisin Public Advisory
Council
Rich Weirich, Frenchtown Township
Tom Tarleton, Michigan Economic
Development Corporation
Paula Holtz, City of Tecumseh
Keith McCormack, Hubbell, Roth, and Clark

Economic Development Region 10

October 21, 2013 – Detroit

SEMCOG

Tom Doran, Engineering Society of Detroit
Malik Goodwin, Detroit Economic Growth
Corporation
Rebecca Witt, Greening of Detroit
Anne Vaara, Clinton River Watershed Council
Laura Rubin, Huron River Watershed Council
Gerard Santoro, Macomb County Planning
Tom Woidwode, Southeast Michigan
Community Foundation
Jim Ridgway, Alliance of Rouge Communities
Bob Burns, Friends of the Detroit River
Lynne Seymour, Macomb County Public
Works
Tim O'Brien, Sustainable Water Works
Joe Depinto, LimnoTech
Brian Tingley, City of Mount Clemens
Merrie Carlock, City of Southfield

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Brandy Bakita Siedlaczek, City of Southfield
Michelle Selzer, DEQ
Heidi McKenzie, Ford Motor Company
Jim Wagner, City of Trenton
John Cole, Director of Mechanical
Engineering, Albert Kahn Building
Erma Leaphart-Gouch, Sierra Club
Jay Richardson, Sustainable Water Works
Chris Dorle, Detroit Future City
Jim Nash, Oakland County Water Resources
Commissioner
Sue F. McCormick, Detroit Water and
Sewerage Department
Jamie Shea, Mission Throttle

Office of the Great¹²Lakes Community Water Dialogues Project Report

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Chapter 1: Project Overview

Introduction

In November 2013, the Office of the Great Lakes (OGL) and Michigan United Conservation Clubs (MUCC) contracted both Kuntzsch Business Services, Inc. (KBS) and Spectra Data and Research, Inc. to conduct 16 Community Water Dialogues throughout Michigan. The project sought to accomplish four objectives:

- Provide the Office of the Great Lakes with an understanding of sixteen communities' vision for the future of their respective water resources
- Identify challenges to implementing these visions in different community types
- Identify opportunities to address common challenges
- Provide communities with a basic jumping off point from which to leverage water resources—if desired

Identification of Communities and Participants

In order to ensure appropriate identification of communities and participants, Community Profile and Participant Profile Matrices were developed to describe the key elements of a community and participant profile to be represented through the Water Dialogues. These matrices were employed to ensure adequate representation of communities and individual participants.

Community Profile

In order to ensure a reasonable representative and actionable sample of communities in which to conduct Water Dialogues, communities were identified to meet the following criteria:

- At least three communities from each area of the state (Upper Peninsula, Northern Lower Peninsula, Southwest Lower Peninsula, and Southeast Lower Peninsula) were represented
- At least one community from each prosperity region was represented
- At least four small, medium, and large communities were represented in addition to two urban core communities
- High-capacity and low-capacity communities were represented within each community type
- Communities that represent each of the water assets (e.g. rivers, streams, inland lakes, Great Lakes) and water-based industry types (e.g., extractive, dependent, recreational) were represented within each community type and area of the state

Table 1 summarizes the criteria considered when selecting communities. However, Community Capacity and Water-based Industry are not included in the table. Community Capacity is not identified in the table because it was simply too subjective to measure, especially prior to conducting sessions. Water-Dependent Industry is not listed because each industry type was found to be relevant in nearly all communities (see Chapter 2).

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Table 1: Water Dialogue Session Information

Community	Area of State	Prosperity Region	Community Type	Water Assets	Date	# of Participants
Caseville	Eastern Lower	6	Small	River, Great Lakes	Mar. 14	14
Dearborn	Eastern Lower	10	Large	River	Feb. 11	11
Flint	Eastern Lower	6	Urban Core	River, Inland Lakes	Feb. 10	12
Grand Ledge	Eastern Lower	7	Medium	River	Jan. 7	12
Jonesville	Eastern Lower	9	Small	River	Feb. 18	8
Midland	Eastern Lower	5	Large	River, Inland Lake	Feb. 4	11
Alpena	Northern Lower	3	Medium	River, Great Lakes	Jan. 22	11
East Jordan	Northern Lower	2	Small	River, Inland Lake	Jan. 21	9
Traverse City	Northern Lower	2	Medium	Great Lakes, River	Feb. 5	15
Manistique	Upper Peninsula	1	Medium	Great Lakes, River	Jan. 14	5
Marquette	Upper Peninsula	1	Large	Great Lakes	Jan. 15	9
Barry County	Western Lower	4	Large	Rivers, Inland Lakes	Jan. 21	14
Battle Creek	Western Lower	8	Large	Rivers, Inland Lake	Feb. 12	8
Grand Rapids	Western Lower	4	Urban Core	River	Jan. 8	11
Muskegon	Western Lower	4	Large	Great Lakes, River	Jan. 22	17
New Buffalo	Western Lower	8	Small	Great Lakes	Feb. 12	7
Total						174

Water Dialogue sessions were conducted between January 7th and March 14th, 2014 (see Map 1). Each session was planned for three hours and included a mix of presentation, individual input, and small group work. Great care was taken to ensure that participants represented community leadership in the broadest sense, and avoided participation from only the 'usual cast of characters'. The structure of each session drew from National Charrette Institute techniques as well as techniques developed by the Center for Creative Leadership.

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Map 1: Water Dialogue Community Location



Participant Profile

Similar to the targeted and deliberate selection of communities, session participants were also targeted to represent specific perspectives of community leadership. Participants were sought that represented a range of characteristics, including, but not limited to:

- Diverse perspectives such as elected officials, community staff persons, tribal leaders, community residents, recreational users, industry workers, local business community leaders, faith-based leaders, regional interests, and economic development officials
- Differing levels of water-related subject matter knowledge
- Varied levels of engagement in their respective community
- Varying ages

In preparation for each Water Dialogue session, a significant amount of outreach work was conducted to engage participants with the desired characteristics. The level of outreach varied significantly with each session, but required significant targeted outreach to specific individuals given the project's short timeframe and the nature of the targeted population.

Community leaders and stakeholders identified by the project team were contacted first to gauge their interest in participating in such a session and also to provide contact information

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for other community members that would have interest in the Water Dialogues. Additional follow-up was then conducted with additional community members identified by leaders and stakeholders. This preparation work set the stage for well-balanced conversations within each community and was critical to the overall success of the project.

Table 3 identifies participation by participant perspective and Figures 2 and 3 display the level of subject matter expertise and community engagement, respectively. Finally, Figure 5 details participation by age group.

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Chapter 2: Survey Results

Pre-Survey

Each participant in the Water Dialogue Project was asked to complete a pre-workshop and a post-workshop exit survey. This section details results from pre-workshop surveys.

Once participants were identified (see Appendix A), they were emailed a link to an online survey and the link was again provided 24 hours prior to each Water Dialogue. Paper copies of the survey were also provided at each session. The pre-survey was designed to provide basic information about participants and their connection to community water resources.

Table 2: Respondents by Community

Community	# of Responses	# of Participants
Alpena	13	11
Barry County	10	14
Battle Creek	7	8
Caseville	6	14
Dearborn	11	11
East Jordan	8	9
Flint	8	12
Grand Ledge	12	12
Grand Rapids	12	11
Jonesville	5	8
Manistique	2	5
Marquette	10	9
Midland	7	11
Muskegon	14	17
New Buffalo	7	7
Traverse City	14	15
Total	145	174

The pre-survey set the stage for a meaningful dialogue at each session.

To begin, individuals were asked to identify which community and which perspective category they were representing. Table 2 provides the number of individuals who responded to the pre-survey for each respective community.

Table 3 displays the proportion of participants that fell into each perspective category. The categories that represented the largest proportion of individuals in the pre-survey were Community Residents (47%), Recreational Water Users (44%), and Community Leaders (26%). Please note that individuals were encouraged to check all categories that applied to them. A description of perspectives by community is included in Appendix B.

Table 3: Pre-Survey Perspective Category Totals

Perspective Represented	Pre-Survey Responses	% of Total Individuals
Community Resident	68	47%
Recreational Water User	64	44%
Community Leader	37	26%
Environmental Advocate	35	24%
Economic/Community Development Professional	26	18%

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☰ Number: 2 Author: Finnelle Subject: Typewritten Text Date: 5/5/2015 10:14:59 AM

☰ Number: 3 Author: Finnelle Subject: Typewritten Text Date: 5/5/2015 10:28:34 AM

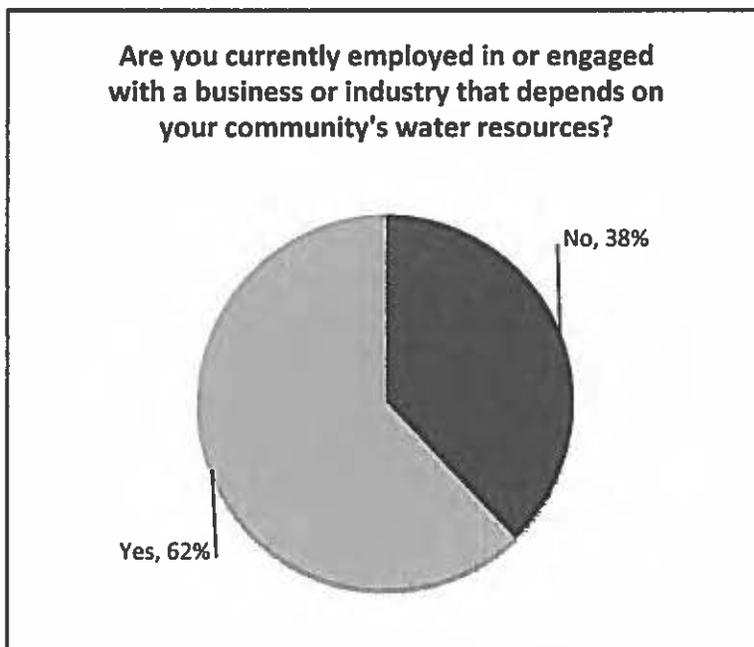
Table 3 Continued

Perspective Represented	Pre-Survey Responses	% of Total Individuals
Conservation Professional	24	17%
Appointed Official	21	14%
Local Business Owner	19	13%
Municipal Staff Person	16	11%
Elected Official	11	8%
Water-Based Industry Representative	12	8%
Active Member of Local Faith Community	11	8%
Regional or County Representative	11	8%
Industrial or Agricultural Water User	8	6%
Student	5	3%
Tribal Leader	0	0%
Total # of Perspectives Identified		368
Total # of Individuals Who Completed Survey		145
Average Perspectives Per Individual		2.54

Figure 1 indicates that a large majority of participants (62%) are either currently employed in or engaged in a business or industry that depends on water resources.

As part of the pre-survey, respondents were asked to rate their knowledge of their community's water assets along with their level of engagement within the community. Responses to these questions are included in Figures 2 and 3, respectively.

Figure 1: Proportion of Individuals Dependent on Community Water Resources



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☰ Number: 2 Author: Finnelle Subject: Typewritten Text Date: 5/5/2015 10:15:17 AM

☰ Number: 3 Author: Finnelle Subject: Typewritten Text Date: 5/29/2015 11:44:46 AM

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☰ Number: 4 Author: Finnelle Subject: Typewritten Text Date: 5/5/2015 10:15:06 AM

Figure 2 indicates that 77% of all survey respondents felt they were at least “Relatively Informed” when it comes to issues surrounding their community’s water assets. Only 4% felt they had very limited knowledge of such issues.

When respondents were asked to classify their level of engagement within their community, 99% indicated they were at least “Somewhat Engaged”. Only 1% of all respondents rated themselves as “Not Engaged”.

Following these self-evaluative questions, respondents were asked to consider in what ways water is important to their respective community. Potential responses included human consumption, recreational use, agriculture, industry, tourism, business, public space, waste management, natural habitats / ecosystems, community pride, and sense of place / community character. Individuals were asked to select all uses they felt were applicable. Responses to this question are summarized in Figure 4.

Figure 2: Level of Knowledge Regarding Water Assets

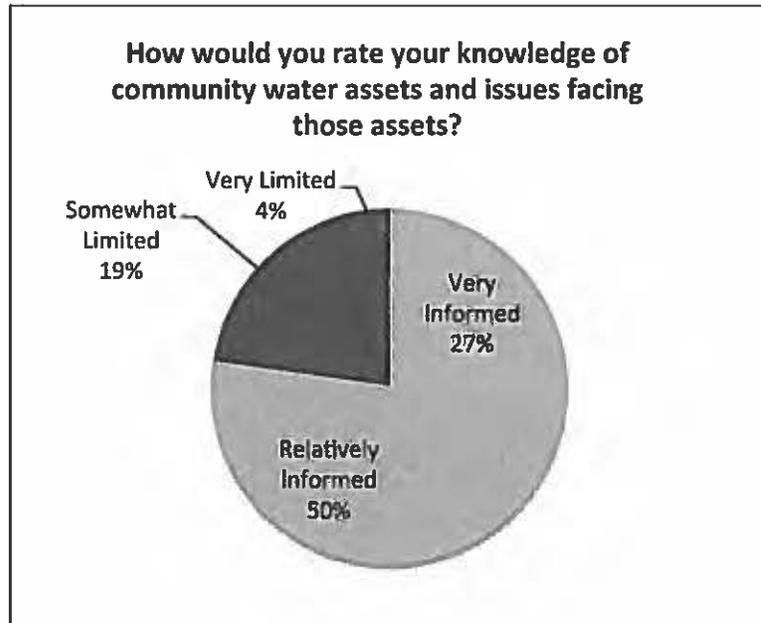


Figure 3: Level of Engagement within Community

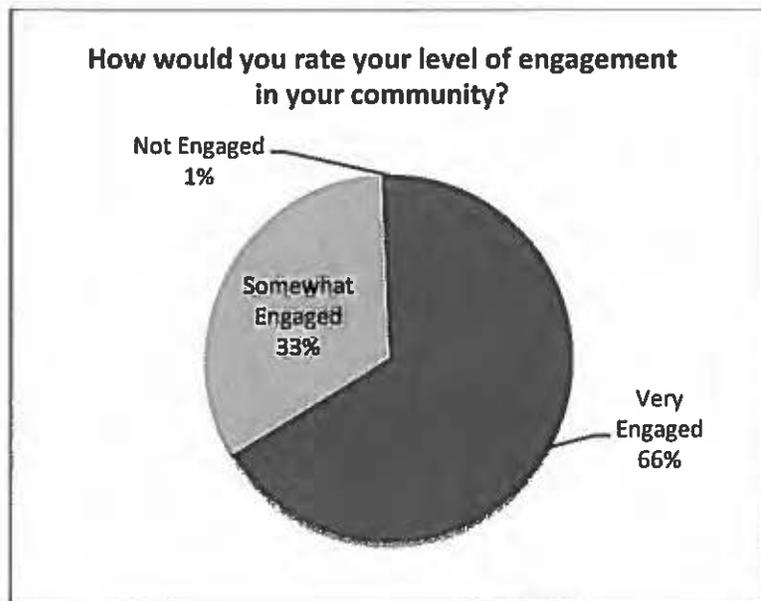


Figure 4 shows that potential uses for water identified in the pre-survey received votes from at least 50% of the respondents. Waste Management received the lowest number of responses at roughly 56%, while Recreational Use was the highest at 97%.

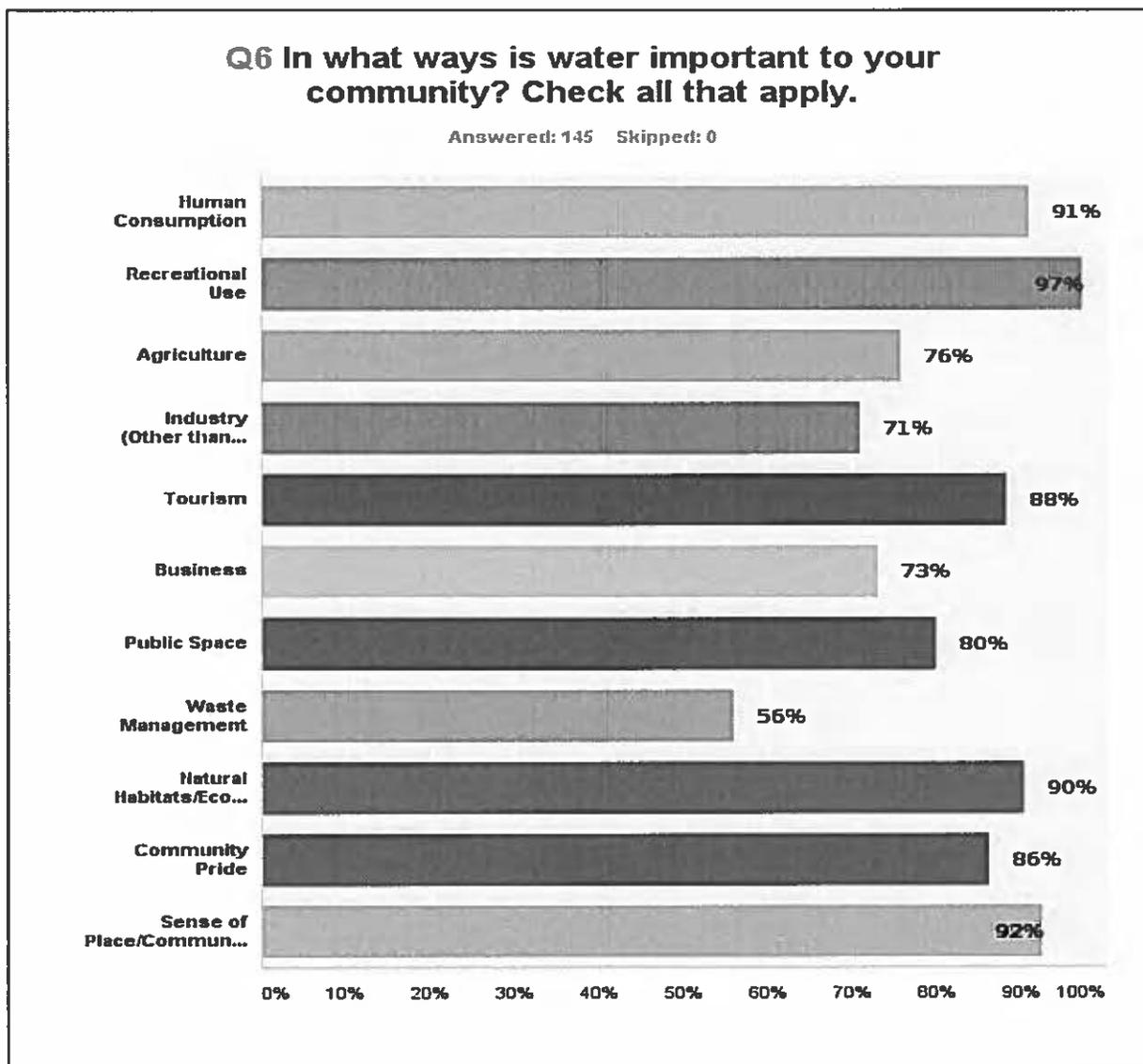
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☰ Number: 2 Author: Finnelle Subject: Typewritten Text Date: 5/5/2015 10:28:46 AM

☰ Number: 3 Author: Finnelle Subject: Typewritten Text Date: 5/5/2015 10:28:41 AM

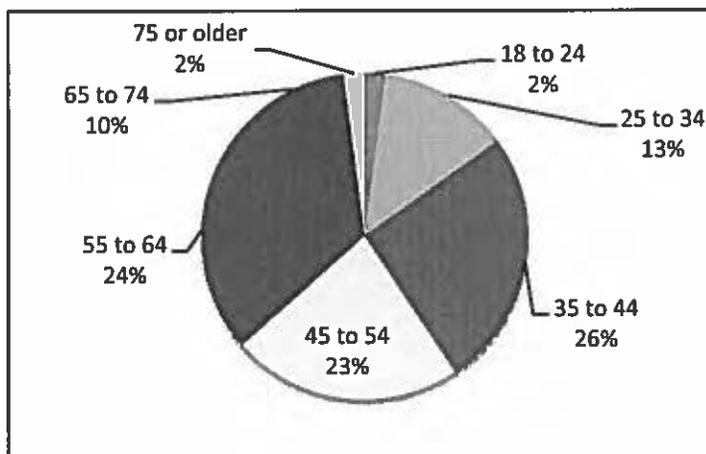
Figure 4: How Is Water Important?



Finally, respondents were asked to provide their age. Figure 5 illustrates the age ranges of respondents to the pre-survey.

Approximately 75% of all respondents were between the ages of 35 and 64.

Figure 5: What is Your Age?



Exit Survey

Following the last organized activity of each session, participants were asked to provide general feedback and comments on the session. A total of 145 individuals responded to the exit survey, out of 174 total participants, giving the exit survey a response rate of 83.3%. Participants were asked the following questions:

- How satisfied are you with today's meeting?
- Was there something in particular that you wish was done differently during today's meeting?
- Are there any issues or concerns that were not identified today that you would like to identify for the group?
- On a scale of 1 to 5, 1 being not confident at all and 5 being very confident, how confident are you in your community's ability to capitalize on its water resources?

Participant Satisfaction

Figure 6 depicts the level of satisfaction of participants in all sessions. There were no responses from individuals that indicated they were "not satisfied" with the session. 95% of participants were either "satisfied" or "very satisfied" by the session.

What could be Done Differently?

Common themes from participants after completing the session were that more participants would have been beneficial to the session, many were curious how this individual session would be used to help create the statewide strategy, and many wished to see a follow-up meeting for further discussion. Detailed responses are included in each individual community report.

Issues or Concerns

Participants also identified common issues and concerns upon completion of the session. Many were concerned with the next steps to move from conversation to action. There was hope that the Office of the Great Lakes

Figure 6: Exit Survey Level of Satisfaction



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would be able to provide implementation best practice resources.

Comparing Confidence: Before and After the Dialogue

The question “On a scale of 1 to 5, 1 being not confident at all and 5 being very confident, how confident are you in your community’s ability to capitalize on its water resources?” was asked in both the pre-survey and exit survey. The purpose of this question was to measure any change in confidence as a result of the Water Dialogue session. Table 4 displays pre- and post-session confidence by community.

Table 4: Comparing Confidence

Community Name	Pre-Survey Average Confidence	Exit Survey Average Confidence	Difference
Alpena	3.54	4.00	+0.46
Barry County	3.60	3.75	+0.15
Battle Creek	3.57	3.57	0.00
Caseville	3.00	3.45	+0.45
Dearborn	3.82	4.15	+0.33
East Jordan	3.38	4.00	+0.62
Flint	3.13	3.75	+0.62
Grand Ledge	3.58	3.92	+0.34
Grand Rapids	4.08	4.50	+0.42
Jonesville	3.40	3.83	+0.43
Manistique	3.00	4.80	+1.80
Marquette	3.30	4.13	+0.83
Midland	3.57	4.00	+0.43
Muskegon	3.62	3.91	+0.29
New Buffalo	3.71	3.71	0.00
Traverse City	3.62	3.92	+0.30
All Communities, Average	3.50	3.96	+0.47

Session participants tended to feel more confident in their community’s ability to capitalize on its water resources following the Community Water Dialogue. No communities were less confident after the session had occurred and community confidence increased an average of 0.47 points from pre-survey to exit survey. The community that experienced the greatest jump in confidence was Manistique, increasing from a 3.0 average in the pre-survey up to an average of 4.8 in the exit survey. Two communities saw no change from before to after the session; Battle Creek and New Buffalo.

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Chapter 3: Water Dialogue Results

This chapter summarizes the data gathered during all 16 Water Dialogues. A representative from KBS or Spectra Data & Research, Inc. facilitated each session. Information is presented in the same order as it was gathered during each Water Dialogue session.

Vision

As a warm-up for other activities, participants were initially asked to complete the statement, "When I hear the words *[Insert Community]* and *water*, what I think of is..." KBS then categorized the responses as shown in Table 5. Responses to this question are displayed in Table 5:

Table 5: When I hear the words *[Insert Community]* and *water*

Response Category	Occurrences	Communities
Recreation	7	Barry Co, Caseville, East Jordan, Jonesville, Manistique, Midland, Muskegon
Pollution	5	Dearborn, Flint, Marquette, Midland, Muskegon
Beauty	5	Barry Co, Caseville, Manistique, Marquette, Muskegon
Drinking Water	5	Barry Co, Battle Creek, Caseville, Manistique, Midland
Fishing	5	Caseville, Flint, Marquette, Muskegon, New Buffalo
Quality	5	Barry Co, Caseville, Marquette, Midland, Traverse City
Economy	4	East Jordan, Manistique, Marquette, Muskegon
Tourism	4	Barry Co, Caseville, East Jordan, Muskegon
Opportunity	3	Alpena, Manistique, Traverse City
Accessibility	2	Jonesville, New Buffalo
Connectivity	2	Dearborn, Grand Rapids
Identity	2	Muskegon, Traverse City
Industry	2	Dearborn, Flint

Following the preliminary association exercise, participants were asked to think more fully about a vision for their community's water resources. Participants were asked to reflect on their first responses and consider the following: "Keeping your responses in mind, imagine you have been gone from this community for 20 years and have just returned. With the best hopes in mind for the community's water resources, how would you imagine your community's water resources as compared to today?" Participants were then directed to select a Visual Explorer (VE) Card that best represented their vision. Figure 7 depicts an example of VE Cards selected by participants at the Grand Rapids session.

Once a collage of images describing the vision for the future was established, participants were divided into small groups to identify the key elements of their vision. For example, most collages included pictures of recreational boaters and/or fishing, making *recreational use* a key

element of these visions. Elements were then categorized into the common definitions identified in Table 6.

Figure 7: VE Cards selected in Jonesville



Table 6: Vision Element Definitions

Vision Element	Definition
Accessibility	Water resources must be accessible for all users; whether it is for recreation, industry, agriculture, or education
Recreation	Use of water for entertainment, including swimming, kayaking, boating, hiking, water trails, and going to beaches or harbors to enjoy the water resources
Balance	No single use for water should override the others. Everyone has a right to use the water and so compromises must be reached to accommodate all users.
Connectivity	Creating processes for bridging the gap between potential water users and water-related actions
Destination	A unique sense of place for a community based on an identity related to water
Economy	Agriculture, industry, tourism, and recreation related economic activity
Education	K-12 school programs, along with higher education and general education for residents related to water
Health	Water resources should provide for active lifestyles. Pollution should not be a concern.
Preservation & Protection	Ensure long term viability of community water resources
Quality & Quantity	Water should be clean and the supply adequate to support community needs
Sustainability	Ensuring that future generations have the ability to utilize water-related resources to meet their needs

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Table 7 provides an overview of common vision categories across each community. Water quality and quantity were discussed most often, appearing in 12 community vision discussions. Accessibility and recreation were next, appearing in ten and eleven communities, respectively. All of the remaining categories were cited relatively equally, appearing in three to seven community vision discussions.

Table 7: Key Elements of Each Community's Vision

Community	Response Category										
	Access- ibility	Recrea- tion	Balance	Connec- tivity	Destin- ation	Economy	Education	Health	Preser- vation & Protection	Quality & Quantity	Sustain- ability
Alpena		X	X	X				X		X	X
Barry County	X		X			X		X	X	X	
Battle Creek	X	X		X						X	
Caseville		X							X	X	
Dearborn	X	X	X	X	X	X		X	X	X	
East Jordan		X	X						X	X	
Flint	X				X			X			
Grand Ledge		X					X			X	X
Grand Rapids	X	X			X					X	
Jonesville		X					X			X	
Manistique	X								X		
Marquette	X	X				X				X	
Midland	X	X								X	X
Muskegon	X		X	X		X	X		X	X	X
New Buffalo				X			X	X			
Traverse City	X	X		X		X			X		
Total	10	11	5	6	3	5	4	5	7	12	4

Throughout visioning exercises participants expressed surprise that developing consensus around a vision for the future of community water resources was relatively simple. Many political issues and differences between individuals were non-issues. As an overarching theme, there was a sense that a balance of uses was critical. In addition, it was clear in most communities that water presents an opportunity for both economic development and recreational tourism, both of which represent missed opportunities in many communities. With this understanding in mind, the session turned its focus toward transforming vision into action.

Generating Community Actions

Following development of a common vision for water resources, participants were asked to identify specific actions to be taken to implement the vision. First, participants identified ways that they, as individuals, could implement the vision. Next, participants identified ways that

other community members, as individuals, could alter their respective actions. Finally, participants identified ways that the community, collectively, could begin to implement the vision.

Individual responses to each of these questions were summarized into 18 common categories.¹ Table 8 provides a definition and example for each category.

Table 8: Categories for Community Action

Category	Definition	Example
Advocate	Devote skills to water-related causes in the community	Advocate for new funding sources, for government action, for local legislative change, or for water-based action
Be Open	Understanding that new ideas or change within the community is not always a negative	Be open minded to innovative funding discussions
Collaborate	Work with other entities to aggregate potential impact	Government and nonprofit organizations working together on water-related projects
Communicate	Encourage dialogue between interested parties	Discuss the importance of water resources with coworkers
Connect	Work to join stakeholders that may have mutual interests	Connect business and conservation efforts
Donate	Give money to causes or groups that support the vision	Donate to a water-based nonprofit
Educate	Inform children, friends, family, or interested community groups about water-related issues	Send water-related research to community leaders
Engage	Participate in community events to make your voice heard	Engage students to participate in a river cleanup
Find Funding	At a community scale, be proactive in seeking out new funding opportunities	Create a new storm water fee to increase community revenue
Legislate	When a need is identified within the community, act swiftly to address it via appropriate local legislation	Implement zoning changes to match Master Plan vision
Listen	Be open to the viewpoints of others and try to reach compromises	Listen to a fellow community member's idea that may be in opposition to yours

¹ Approximately 10% of all individual responses from the "Generating Community Actions" section (You, Others, and Community) and the "Developing an Action Strategy" section (How, Who, Funding, Barriers, Continued Success) were eliminated during the analysis phase because they were either not applicable to that category or illegible.

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Table 8 Continued

Category	Definition	Example
Market	Devote time and resources to “selling” water-related programs or events	Develop a branding strategy associated with community water resources
Proactive	Identify and address potential problems before there are negative consequences	Improve waste treatment systems to avoid water quality problems
Promote	Spread the word about positive change within the community or to potential visitors	Use networking channels to inform others about potential uses of community water resources
Reduce Pollution	Do not contribute to contamination of community water resources	Do not dump harmful cleaning chemicals down the drain
Support	Ensure that organizations, programs, or projects have the resources they need to succeed	Help a community event with fundraising efforts
Use the Resources	Spend time using the community’s water resources	Go kayaking with family
Volunteer	Donate personal time to community-based efforts	Offer to join a water-based nonprofit

What can You do Differently?

Participants were asked to consider what actions they could change, at the individual level, in order to have a positive impact on their community’s water resources. Table 9 summarizes the main categories from these responses. Educating oneself or others was the overarching principle, while promoting interests and engaging more in the community was common as well.

What can Others, as Individuals, do Differently?

Next, participants discussed what other community members, as individuals, could do differently. Table 10 provides a summary of the common ideas from these discussions. Similar to Table 9, the common categories were educating oneself or others and engaging in the community.

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☰ Number: 3 Author: Finnelle Subject: Typewritten Text Date: 5/5/2015 10:16:31 AM

Table 9: What can You do differently?

Category	Occurrences	Communities
Educate	25	Barry Co, Caseville, Dearborn, East Jordan, Grand Ledge, Grand Rapids, Jonesville, Manistique, Marquette, New Buffalo, Traverse City
Promote	15	Alpena, East Jordan, Midland, Muskegon, Traverse City
Engage	13	Alpena, Battle Creek, Dearborn, Flint, Grand Ledge, Grand Rapids, Midland, Traverse City
Volunteer	13	Alpena, Caseville, Dearborn, Grand Ledge, Flint, Traverse City
Stop Polluting	13	Barry Co, Caseville, Marquette, New Buffalo, Traverse City
Advocate	12	Barry Co, Battle Creek, Caseville, Flint, Muskegon, Traverse City
Connect	11	Caseville, Jonesville, Traverse City
Use the Resources	8	Battle Creek, Dearborn, East Jordan, Flint, Midland
Communicate	7	Alpena, East Jordan, Flint, Muskegon, Traverse City
Be Open	5	Grand Ledge, Grand Rapids, Manistique, Midland
Listen	4	Barry Co, Dearborn
Donate	1	Flint
Total	127	

Table 10: What can others do differently?

Category	Occurrences	Communities
Educate	17	Barry Co, Caseville, Dearborn, East Jordan, Grand Ledge, Grand Rapids, Jonesville, Muskegon, New Buffalo, Traverse City
Engage	16	Alpena, Barry Co, Flint, Grand Ledge, Jonesville, Midland, Muskegon, Traverse City
Stop Polluting	13	Barry Co, Flint, Grand Ledge, Jonesville, Marquette, Midland, Muskegon, New Buffalo
Connect	11	Alpena, Caseville, Dearborn, East Jordan, Flint, Grand Rapids, Jonesville, Marquette, Muskegon, Traverse City
Be Open	7	Barry Co, Grand Rapids, Marquette, Traverse City
Promote	7	East Jordan, Flint, Grand Rapids, Muskegon, New Buffalo
Use the Resources	6	Barry Co, Battle Creek, Grand Rapids, Marquette, Traverse City
Volunteer	6	Battle Creek, Dearborn, Jonesville, Manistique, Marquette, New Buffalo
Communicate	6	Battle Creek, East Jordan, Flint, Jonesville, Traverse City
Listen	6	Barry Co, Grand Ledge, Grand Rapids, Traverse City
Donate	5	Barry Co, Caseville, Marquette, Midland, Muskegon, Traverse City
Support	4	Flint, Grand Ledge, Jonesville, Muskegon
Total	104	

From: [Stephanie Chang](#)
To: [mi-waterstrategy](#)
Cc: [Ellen Hejnitz](#); [Alex Garza](#)
Subject: Public comment submission - Michigan's draft water strategy
Date: Tuesday, August 25, 2015 5:33:37 PM
Attachments: [MI water supply public comment SChang.pdf](#)

Attached is my public comment regarding Michigan's draft water strategy. Thank you for the opportunity to share my views and I look forward to reading the final version of the water strategy as it becomes available. If you have any questions, please do not hesitate to contact my office.

Stephanie Chang
Michigan State Representative, District 6
S685 House Office Building
Mailing Address: P.O. Box 30014, Lansing, MI 48909-7514
Phone: 517-373-0823
Email: schang@house.mi.gov

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MICHIGAN HOUSE OF REPRESENTATIVES

STEPHANIE CHANG
STATE REPRESENTATIVE

Public Comment Regarding Michigan's Draft Water Strategy
August 25, 2015

Thank you for the opportunity to submit public comment on Michigan's draft Water Strategy. I am particularly glad that goal number two, "Michigan's water resources are clean and safe", is included in the strategy and that there is a focus on protecting drinking water supplies, and that goal number six, "Michigan invests in infrastructure and supports funding to maintain clean water and healthy aquatic ecosystems", includes a mention of Detroit's recent water shutoffs and the need for evaluation of current local practices regarding the provision of water.

On June 3, 2015, Representatives Sheldon Neeley, LaTanya Garrett, and I held a public hearing at the State Capitol about Water Safety and Affordability. Residents and community leaders from Detroit, Highland Park, Flint, and other areas joined us to share their stories about water shutoffs, the contamination of the water supply in Flint, and the ongoing crisis in Highland Park.

It is imperative that our state should do more to ensure that the water each of our residents drink is safe, and when there is information available indicating that water is unsanitary, residents need to be notified in a timely manner. The draft water strategy notes that "public water supplies are subject to oversight and frequent inspections to ensure sanitary conditions" yet the situation in Flint in the past year makes it clear that this system has not worked in the way that it should to protect residents.

I am glad that goal number six includes recommendations regarding strategies to support infrastructure improvements and evaluation of "current community practices regarding providing water to financially distressed customers to ensure all citizens have affordable access to water for drinking and sanitation." This should be a high priority for the state of Michigan – but we must go further than evaluating current practices and institute a policy at the state level that every resident has the human right to safe, affordable and accessible water. Our state should also institute policies that protect our most vulnerable populations – including seniors, those with chronic medical conditions requiring access to water, pregnant women, and families with children – from shut offs. Our state should also require water systems to provide data regarding their water rates and any shutoffs that have taken place. Lastly and perhaps most importantly, our state should develop an affordability plan that ensures that residents pay water bills that are based on their household income and ability to pay.

I am working with several other lawmakers in a bipartisan and geographically diverse workgroup to develop a package of legislation to address some of these critical issues related to water affordability and safety. We hope to have legislation introduced by the end of this calendar year. I look forward to reading the final version of Michigan's Water Strategy and working with various parties to address Michigan's water crisis.

From: [Joseph Aragona](#)
To: [mi-waterstrategy](#)
Subject: Suggestions to Michigan's Water Strategy
Date: Tuesday, August 25, 2015 5:38:13 PM
Attachments: [letter to office of great lakes.pdf](#)

Director Jon Allan,

Please see the attached letter from Representative Forlini regarding the draft of Michigans water strategy.

If you have any questions or concerns, please do not hesitate to contact me.

Joseph A. Aragona
Legislative Director
Rep. Anthony G. Forlini (24)
(517) 373-5746



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MICHIGAN HOUSE OF REPRESENTATIVES

ANTHONY G. FORLINI
STATE REPRESENTATIVE

COMMITTEES:
FINANCIAL SERVICES, CHAIR
FAMILIES, CHILDREN, AND
SENIORS
NATURAL RESOURCES
TOURISM AND OUTDOOR
RECREATION

John Allan
Director
Office of the Great Lakes
P.O. Box 30473
Lansing, MI, 48909

Director Allan,

I'd like to commend you for the work you have put in on your "Sustaining Michigan's Water Heritage" report regarding the plan for managing Michigan's water in the future. I agree that we need a long term plan and I believe that focusing on Michigan's recreational harbors, creating more access for the public to Michigan's coastlines, reducing phosphorus in lake basins, and expanding beach monitoring are all laudable goals.

However, as a state we need to focus more on what is causing the problem rather than just the effects we see in our ecosystem. I live in Harrison Township; a waterfront community on Lake St. Clair. I've lived here for decades and I have seen sewage being dumped into the lake for many years. The infrastructure of southeast Michigan is in desperate need of an upgrade as it was not meant to handle our current population. Much of the infrastructure here dates back to the mid-19th century. This problem is exacerbated when large to medium storms roll through the area dropping large amounts of rain causing even more untreated overflow of water and sewage from the sewer system straight into the lake.

What makes matters worse is that the communities "upstream" from the lake and river will dump excess sewage into the drainage system with very little fines. That is the core of the problem in southeast Michigan. It is cheaper for communities to pollute, than to treat the sewage they dump in our backyard. They have no incentive to become good actors when we let them pollute for next to nothing. Clean up efforts are expensive, but they have become a normal way of life on the lakefront.

I'd like to offer you a solution to this problem that I hope you will consider. The communities "upstream" should pay five times the cost of properly treating their sewage. The money then would be used for the cleanup of their neighbors on the lake whenever they dump in excess into the drains. These dollars should not be passed through a state agency to be considered as a revenue for funding other projects. This money should go straight to the lakefront communities to assist them in their cleanup efforts.

This tragedy has become the norm for years, allowing efforts to fix this disaster to become lackluster and even ignored. The report says that "water defines Michigan," well if we don't do something soon, sewage will define Michigan. I look forward to hearing from you on my proposal.

Anthony G. Forlini
State Representative
24th House District

From: [Greg Potter](#)
To: [mi-waterstrategy](#)
Subject: comment Michigan Water Strategy
Date: Tuesday, August 25, 2015 8:55:28 PM

The Michigan Water Strategy draft was well done. However I do have the following suggestions.

Groundwater, navigable and non navigatable streams should be held in a public trust. The Attorney General should be charged with protecting the citizens of Michigan's interest

All agencies and departments responsible for our waters and fisheries should be organized by watersheds.

Permitting of common practice for dam removals and common habitat projects needs to be streamlined. We have been doing these projects for a while now, not everything is a pilot of demonstration project anymore.

We need to develop common acceptable designs for bufferstrips, stormwater swales and rain gardens to speed up implementation.

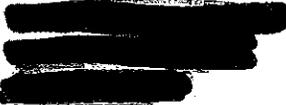
Many county drain offices are now water resource commissions. The drain code needs to be rewritten to reflect the change. These offices need to be watershed rather than county based, and permitting standards need to be applied. We have had too many failures through the intercounty system and lack of contractor oversight.

Concentrating on brook trout in our headwaters, sturgeon for connectivity and lake trout for great lakes makes sense. I believe we need to add smallmouth bass as the species of interest on cool water sections of streams and rivers.

Net pen and flow through aquaculture systems need to be treated as CAFOs with site specific and cumulative maximum limits for nutrients and other pollutants with abandonment requirements when limits are reached.

Water literacy needs to be integrated into the K-12 curriculum.

Thank you the opportunity to comment,

Greg Potter


Sent from AT&T Mail on Android

From: [Atkinson, Alyssa A](#)
To: [ml-waterstrategy](#)
Cc: [chersey@pscinc.com](#); [Nash, James H](#)
Subject: Oakland County WRC - Comments on MI Water Strategy
Date: Wednesday, August 26, 2015 9:44:55 AM
Attachments: [Signed_OCWRC_CommentOnDraft_MIWaterStrategy.pdf](#)

Please see attached for Oakland County Water Resources Commissioner Jim Nash's comments on the draft of the Michigan Water Strategy.

A hard copy is also being mailed to the office of Jon Allan.

Thank you,

Alyssa Atkinson
Assistant to the Commissioner
Oakland County WRC
(248) 858-0967



Jim Nash

August 25, 2015

Mr. Jon Allan
Director, Office of Great Lakes
P.O. Box 30473
Lansing, MI
48909-7973

Re: Comment on Draft - Michigan Water Strategy

Dear Mr. Allan:

Thank you for the opportunity to comment on the Draft Water Strategy. It is clear that a great deal of time, effort, and thought went into the preparation of the Strategy. Our first comment is to say thank you to all those who participated in crafting this document.

We share the sense of pride in our water resources so evident in the Strategy. It is that shared sense of pride that motivated our comments and suggestions, all of which are rooted in our desire to make this Strategy as useful as possible to both state and local governments.

We have worked in collaboration with others in reviewing the draft Strategy. In particular, we support the detailed comments provided by both SEMCOG and MWEA. Each of those representative membership organizations are excellent experts and bellwethers. We encourage your careful consideration of their suggested modifications.

For the most part, our comments are more overarching and thematic. To the extent you agree, we would be happy to work with you in the crafting of specific language . . . but only if it would be helpful. Otherwise, we trust you will knit together and align our suggested directional modifications based on the comments of others as well.

The Vision

We do not view the Strategy's vision as something that should be either generic or trivial. Our hope is that it is compelling, inspiring and represents the culture of thinking suggested in the Strategy. We suggest the vision be more unique to Michigan and more clearly set us apart from other states. Not just because of our extensive natural water resources, but because of how we view them in the overall context of governance. Lastly, the vision for the Strategy should announce what we intend to do.



To us, the big picture context is quality of life. The state's overall, long term vitality will be determined by the quality of life it provides. And sustained investment in quality of life is inextricable from economic vitality. If the architects of the plan and the State of Michigan also hold this to be true, we urge you to make it explicit early and often.

An example of how our thought process could be reflected in a unique vision that announces what we intend to do is: "Michigan capitalizes on its unique connection to the Great Lakes and all its water asset resources to support economic prosperity which enables sustained investment in protecting those water resources." (Note: to capitalize on our water resources, we have to invest in protecting them just like any other valued asset; economic vitality enables that protection).

Stormwater Management

The OCWRC is leading a multi-agency effort to answer the question: what do we need to do to advance protection and enhancement of our water resources? We believe the science is clear and compelling: do a much better job of managing stormwater. Does the state also believe that stormwater management is the most common key to restoring water from impaired uses? We believe the state's answer is yes, but only by implication. If so, it must be explicitly stated and prominent in the Strategy. If not, ironically, the Water Strategy will reduce local governments' chances of success in addressing the problem. A whole range of the positive actions would trickle out of this powerful recognition in the Strategy. It will appropriately turn much more of the discussion and debate from "what do we need to do" to "how do we do best get it done."

It would also be helpful if the Strategy recognized that stormwater management services are akin to other utility services such as sewage treatment, and the provision of safe drinking water. Lastly, the Strategy could articulate the components of rate structures that represent the true cost of service. This would include the full cycle of asset management: capital, operation, maintenance, and replacement. The Strategy could urge their adoption in utility rate systems recognizing it as an integral feature of investing in our own economic prosperity.

Answering the "So what?" Question – Part 1

The intent that we all own the plan is fairly clear. It is also very appropriate. What is not clear is how the state's initiative to create the Strategy will be accompanied by its use of the Strategy in decision making.

However complex and/or controversial, we urge that the final strategy lead by example. It should articulate some of the ways it will be used to support the state's decision making. And it should do so for departments other than DEQ. This is critical to making the culture of thinking sought in the Strategy, well, a part of the culture of thinking. Our suggested approach to Outcomes and Measures (see below) provides a concrete structure for providing clarity of direction and purpose to a wide range of organizations, including state government.

Answering the “So what?” Question – Part 2

The Strategy can be given immediate impact and credibility through identifying a short list of important actions that must be pursued immediately. Each action should have an explanation of why it rises to the top in the context of the big picture. We urge that one of those actions be geared toward assuring the Strategy supports advancement of stormwater management. We urge the Strategy “support providing owners and operators of stormwater systems with the investment tools necessary to manage this asset because it is fundamental to achieving the vision.”

Outcomes

The focus on outcomes is a great approach for a strategy document. Very appropriately, the Strategy is a product of several state departments reflecting the inter-agency collaboration needed for success. But some outcomes actually read as actions. Two examples follow:

“Surface and groundwater are managed to support sustainable human uses and ecological function.”

“Policies and innovative technologies are developed and adopted to grow and promote sustainable water-based economies. “

Our primary concern is the outcomes in the draft Strategy are presented as new, unique to the Strategy, or both. We urge that the Strategy be built around the very same outcomes to which the whole state aspires in the aggregate. Presently those state outcomes are more implicit than explicit. Yet, they can be readily extracted from speeches, written materials, decisions, etc. We believe that Michigan is rightly focused on quality of life. And we believe that quality of life can be defined by a simple set of outcomes that become the focus of every action we take.

Some examples of what we believe those outcomes to be with example actions from the draft Strategy follow.

Healthy, Accessible Water Resources

- Establish a long-term Water Fund to achieve Water Strategy goals including water infrastructure management
- Prioritize investments in recreational harbors to address long-term infrastructure needs.

Economic prosperity

- Michigan has a strategic focus on water technology and innovation to grow sustainable water-based economies
- Michigan communities use water as a strategic asset for community and economic development.

Quality services

- Pass a statewide sanitary code and inspection requirements.

Healthy neighborhoods

- Develop and implement a water trails system.

Access to jobs, markets and services

- Create an integrated system for managing water at the local level to achieve water quality and quantity outcomes.

This approach would enable and guides any agency of the state, any local government or any advocacy organization in plugging in its own actions in support of an outcome. We believe that is the ultimate process for leveraging resources from multiple organizations, and leveraging them in a singular direction.

Measures

The Strategy's contribution to the state's overall outcome becomes manifest by the selection of a few high level measures. Each measure inspires a long list of very specific sub-measures designed to make selection and tracking of actions manageable and consistent - this daylights the connection between seemingly trivial actions and the big picture. For example:

Outcome: Healthy, Accessible Water Resources

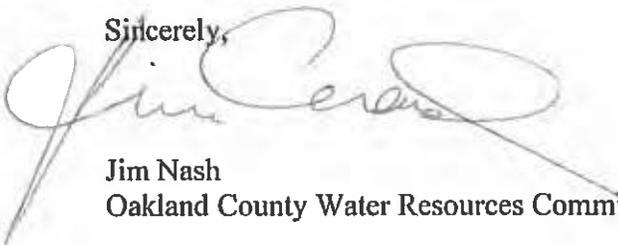
Measures

- Diversity of fish populations
- Territory occupied by invasive species
- Green cover
- Population in watersheds with impaired uses

We also need targets for measures, or at least to discuss the process for setting them which entails consideration of the big picture and "bang for buck" thinking. For example: the goal "By 2030, achieve a 40% reduction in number of designated uses or impaired waters" is actually an interim target that may be very worthy. On the other hand, a systems approach begs the question, "how much does that cost and is it the best use of financial resources in pursuit of the outcomes sought?"

Thank you again very much for the opportunity to comment and your commitment to modify the draft Strategy as appropriate. Please do not hesitate to contact me with questions or concerns.

Sincerely,



Jim Nash
Oakland County Water Resources Commissioner

From: [Finnell, Emily \(DEQ\)](#)
To: [mi-waterstrategy](#)
Subject: FW: Water strategy
Date: Wednesday, August 26, 2015 12:32:44 PM
Attachments: [image001.png](#)

Emily Finnell
Office of the Great Lakes | MI Department of Environmental Quality
PO Box 30473
Lansing, MI 48909
finnelle@michigan.gov
517-284-5036

From: Allan, Jon (DEQ)
Sent: Thursday, May 21, 2015 9:50 AM
To: Petrovskis, Erik
Subject: RE: Water strategy

Eric,

This is a great set of thoughts and comments. We worked like Trojans on the tone and tenor of the report. We are moving ever so close to our public release (scheduled for June 8th) and thus have locked down most of the text of the strategy for this round. Your comments are really important and will form the basis for a thoughtful review as we move through the summer.

One point of context though, particularly as it related to our long term vision for drinking water and aquifer systems. We have had extensive (really extensive and ongoing) discussions about the difference between a practical goal statement and an aspirational goal statement. As it relates to aquifers for human use, we are mindful of the difference between what is achievable and affordable but also that our desire and aspiration is to have aquifers that support the kinds of uses we desire well into the future. We are deeply cognizant that human activity has despoiled considerable aquifer systems (think of the 1 trillion gallons of TCE contaminated water spreading to the northwest from the Kalkaska area (the Wicks plume). We are not willing though to write it off as a matter of course or because it may be hard or costly. There may be no practical way for that aquifer system to be remediated in total and your conception of risk management or abatement is correct, but as a matter of desire for a future condition decades from now, we must set the stage and context for such an effort. Thus the broader context for aquifer systems is to ultimately support the kinds of human use and ecological processes without caveat or condition. That said, the work of the decade will need to be informed with both prioritization for risk as matched against available resources.

Our conception of a groundwater monitoring system is based on the simple premise that groundwater is quickly and substantially increasing in importance, especially for the ag sector. We have added over 2000 high capacity ag wells in the last 5 or so years alone, and as ag continues to moves northwards, the potential clash between ag and natural resource management (coldwater

streams for instance) is imminent. You are correct that we have no basis for a comprehensive cost-benefit statement here but we see ample evidence of this shift and just need to go at it a piece at a time that makes sense. We see this issue as central to the long term value proposition of the state. This is one of the countries great prolific and cost effectively accessible aquifer systems and that we just need to understand it better and manage it better.

I could not agree more with you about the water-energy nexus! Not all of our partners shared this point of view but that is changing and your comments and others will help us make the case stronger. In fact, I just learned that the Michigan Public Service Commission is kicking off some work in this space to look at energy savings potential from municipal water systems (the movement of water) as part of the overall EO program. I like this development.

Again, your insights help greatly in seeing what some of the critical issues are that we will need to be more mindful and clear about in our next version. Thank you for the thoughtful read and comments.

Jon

From: Petrovskis, Erik [<mailto:Erik.Petrovskis@meijer.com>]
Sent: Thursday, May 21, 2015 8:37 AM
To: Allan, Jon (DEQ)
Subject: Water strategy

Joe,

First, my apologies for the delayed review of the draft. The strategy is comprehensive. I liked the tone and level of technical information. I have several high-level comments regarding the strategy:

- Groundwater cleanup needs to be addressed sustainably. Due to technical and financial limitations, remediation of source zones and large dilute plumes to drinking water standards is not feasible. See Kavanaugh reference. The state's and responsible parties' limited resources can focus on eliminating risk.
- The cost-benefit of a state-wide groundwater monitoring network is quite uncertain.
- Understanding the impact of personal care products in Michigan waterways is critical. The industry is removing microbeads ahead of legislation – can the state foster stakeholder groups (retailers, manufacturers, regulators) to address these issues?
- Voluntary efforts to reduce water use for manufacturers are needed, as are incentives, recognition and rewards.
- The strategy should further develop the water-energy nexus. It's touched on when discussing wastewater treatment, but belongs in other sections (water infrastructure) more prominently.
- How do we drive the implementation of LID and green infrastructure? Municipal regulation? Incentives for developers?

Water is an integral part of our business. Please let me know, if you would like our perspectives in the future.

Regards,

From: [Finnell, Emily \(DEQ\)](#)
To: [mi-waterstrategy](#)
Subject: FW: Water strategy
Date: Wednesday, August 26, 2015 12:32:44 PM
Attachments: [image001.png](#)

Emily Finnell
Office of the Great Lakes | MI Department of Environmental Quality
PO Box 30473
Lansing, MI 48909
finnelle@michigan.gov
517-284-5036

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Water is an integral part of our business. Please let me know, if you would like our perspectives in the future.

Regards,

Erik



Erik A. Petrovskis, PhD, PE | Director of Environmental Compliance and Sustainability | Properties
Meijer | 2350 Three Mile Road NW | Grand Rapids, MI 49544
Office: 616-735-7101 Cell: 616-710-2228
erik.petrovskis@meijer.com

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Finnell, Emily (DEQ)

From: mi-waterstrategy
Subject: FW: Great Lakes 30 year report

From: Miller, Candice [<mailto:Candicehr3102@mail.house.gov>]
Sent: Wednesday, June 24, 2015 11:16 AM
To: Allan, Jon (DEQ)
Subject: Great Lakes 30 year report

Excellent work Jon, this is the most comprehensive work product i've seen. One suggestion, although perhaps this is too specific and you only want to speak in generalities, about a dozen years ago we developed a real time water quality monitoring system at the 7 water intakes in the st Clair river and 2 of the lake st Clair intakes, Mt Clemens and new baltimore. The devices checked for almost 30 different contaminants every 15 minuets, it became part of the notification protocols especially for the previously very common, chemical spills in the st Clair river. Once we were able to detect what and from where, guess what, no more chemical spills. But most of the municipalities didn't want to pay for it once the federal dollars ran out, very shortsighted. Also Granholm used federal homeland security dollars to built an extension of this system along the rest of lake st Clair, down the Detroit river. Not sure what's happening there either.

My point is, the only way for this to really work is for the state to take it over and have a plan for the entire system, it really could be an inexpensive model for the entire state.

Anyway, call me if you have any questions or suggestions and sincere good luck in continuing to improve and protect our magnificent great lakes.

Sent from my BlackBerry 10 smartphone on the Verizon Wireless 4G LTE network.

From: [Finnell, Emily \(DEQ\)](#)
To: [mi-waterstrategy](#)
Subject: FW: Follow-Up: Water Usage outside and Inside the home
Date: Wednesday, August 26, 2015 1:39:49 PM

Emily Finnell
Office of the Great Lakes | MI Department of Environmental Quality
PO Box 30473
Lansing, MI 48909
finnelle@michigan.gov
517-284-5036

From: Regina Young [mailto:RYOUNG@bedhd.org]
Sent: Monday, July 13, 2015 12:51 PM
To: Pezza, Gil (MEDC)
Cc: Allan, Jon (DEQ); Finnell, Emily (DEQ)
Subject: RE: Follow-Up: Water Usage outside and Inside the home

Gil,

Thank you for the information. I have ordered this book and look forward to reading it.

I mean no disrespect when I say that I am both intrigued and a bit concerned by your statement of a "flawed system". I will seek to understand the basis and merits behind it. I'm interpreting that the "system" you mean is the public drinking water (community utility water) system more so than the million plus residences served by individual water wells.

In terms of human wellbeing, exposure pathways include multiple human exposure points -- inhalation, dermal absorption, and consumption. From that standpoint, all water used (or re-used) inside the home is of interest to those in Public Health. Safe and protected sources of water is one of the pillars of public health -- prevention. While the prevention of illnesses in the form of "safe" water has a cost, prevention also has great "value". As you pointed out, "we have plenty" has shaped our (past) mindset. I can see a future where Michigan shows, through action, that "we value our water"!

Thank you again!

Regina Young, R.S.
Environmental Health Director

Barry-Eaton District Health Department
Environmental Health Division
e-mail: ryoung@bedhd.org
269-798-4103

We are now on Facebook. Join us today!

www.facebook.com/barryeatonhealth

From: Gil Pezza (MEDC) [mailto:pezzag@michigan.org]
Sent: Tuesday, July 07, 2015 9:49 PM
To: Regina Young
Cc: allanj@michigan.gov; Finnell, Emily (DEQ) (Finnelle@michigan.gov)
Subject: Follow-Up: Water Usage outside and Inside the home

Regina:

I'm following up on the home water usage statistics we briefly touched upon today at the meeting in St. Johns.

With respect to Home Water usage, this topic is discussed in the book *The Future of Water* by Steve Maxwell with Scott Yates. A great read! You can download it on Kindle.

<http://www.amazon.com/Future-Water-The-Steve-Maxwell/dp/1583218912>

It appears that (Chapter 3 – The Future of water use inside the home) 70% of water (treated to drinking standards) is used outside the home. Inside the home, the breakdown of the 30% of indoor water usage is as follows:

Shower 17%

Toilet: 26%

Bath 2%

Dishwater 2%

Laundry 21%

Leaks 14%

Faucet 15%

Other 2%

Furthermore, the water we actually drink (from the Faucet's 15%) could be as low as 1%.

Like Jon pointed out today, this is due to the legacy mind set "we have plenty of water". Of course, if you think of the cost of treating water to drinking standards when only a very small percentage is actually consumed for drinking purposes per household, then this shows how flawed and unsustainable this system is.

Best

Gil

Gil Pezza
Water Strategy Policy Liaison
Michigan Economic Development Corporation
3022 W. Grand Blvd., Suite 14-450 | Detroit, MI 48202
Office: 313-613-4944
pezzag@michigan.org

From: Finnell, Emily (DEQ)
To: [mi-waterstrategy](#)
Subject: FW: Water Shutoffs Information
Date: Wednesday, August 26, 2015 1:46:06 PM

Emily Finnell
Office of the Great Lakes | MI Department of Environmental Quality
PO Box 30473
Lansing, MI 48909
finnelle@michigan.gov
517-284-5036

From: Randy Block [<mailto:randyblock@yahoo.com>]
Sent: Tuesday, July 28, 2015 10:38 PM
To: Finnell, Emily (DEQ)
Subject: Water Shutoffs Information

Dear Emily Finnell:

Thanks for listening to my comments about the need for plans to make water fees more affordable so that consumers can better afford to pay their water bills. Thanks also for your openness to expanding the plan to provide information about what other communities, e.g., Cincinnati and Philadelphia, are doing to establish water affordability plans.

Here's information from a 7/22/15 Detroit Water and Sewer Department report that I obtained from the Sierra Club:

GLWA/DWSD-R Project Implementation Team (P.I.T.) Update

- **Customer Service Division Report**
- July 1, 2014 to June 30, 2015 (past 12 months)
 - 35,595 accounts have been turned off and 17,900 accounts were turned on
- June 1, 2015 to June 30, 2015 (current month)
 - 5,988 accounts have been turned off and 2,016 accounts were turned on.

The 2013 U.S. Census (projected) showed that the average household in Detroit had 2.4 people. This could be a basis for projecting that as many as 47,953 men, women and children may still have their water shut off. This is a problem that can't wait for a long range solution!

You might want to get more information on the City Council's "Blue Ribbon Committee to study a Water Affordability Plan for the City of Detroit. They just voted last Tuesday to create such the Blue Ribbon Committee last Tuesday. You might also want to learn more

about what they're doing in Philadelphia with their new Water Affordability Plan. Roger Colton, a national water expert who developed Detroit's 2005 Water Affordability Plan, is due to be in Detroit tonight and tomorrow morning for a press conference on the above issues. The media event will be held at 10 a.m. at 2727 2nd Avenue, Detroit.

Let me know if I can be helpful to you.

Sincerely,

Randy Block, MSW, Director
Michigan Unitarian Universalist Social Justice Network

From: [Finnell, Emily \(DEQ\)](#)
To: [mi-waterstrategy](#)
Subject: FW: Water Strategy comments
Date: Wednesday, August 26, 2015 1:53:57 PM

Emily Finnell
Office of the Great Lakes | MI Department of Environmental Quality
PO Box 30473
Lansing, MI 48909
finnelle@michigan.gov
517-284-5036

From: Allan, Jon (DEQ)
Sent: Tuesday, August 11, 2015 7:58 PM
To: Evan Pratt; Finnell, Emily (DEQ)
Subject: RE: Water Strategy comments

Evan,

Thanks for the very thoughtful and thorough analysis and insights. Of course, we will study them in close detail.

Jon

From: Evan Pratt [<mailto:pratte@ewashtenaw.org>]
Sent: Tuesday, August 11, 2015 12:02 PM
To: Finnell, Emily (DEQ); Allan, Jon (DEQ)
Subject: Water Strategy comments

Dear Jon and Emily

Thank you for your stewardship over the development of the draft Water Strategy, along with the recent outreach in July and August. Along with many other stakeholders I have spoken with from diverse segments of our economy and demographics, I agree that water is an economic engine that Michigan would do well to harness and manage sustainably.

My understanding from the July public meetings around the state is that while feedback on the positives is always appreciated, the type of input you are currently seeking is constructive, detailed and specific feedback on where we might be able to increase our collective chance of success in implementation. With those instructions in mind, I am attaching a document that is longer than I might have submitted if the goal was brevity vs detail, and offer this over-arching summary of the areas of greatest concern to this office, falling into these five main areas:

1. The Strategy calls for implementation via local leadership. Through the MS4 process, dozens of local leaders, mainly in urbanized areas, have been doing everything in their power for cleaner water, particularly in

urbanized areas where problems are worst. Progress has been substantial, but many obstacles prevent locals from doing what we know is needed. These obstacles require state leadership and commitment of resources if any different outcome is expected. Three specific examples include enabling more local funding tools, providing high-level public engagement and economic development effort, and providing tools to incent compliance with voluntary Recommendations.

In short, the Strategy does not provide much new that one would expect to result in a greater commitment or change in local effort levels in the Grand Traverse, Tri-County, SEMCOG, or GVMC regions. Only about 5% of Michigan's population lives outside those regions, so it would be difficult to expect a change in results if these obstacles, repeatedly identified by local leaders all over the state, are not addressed.

2. The outcomes, or Measures of Success are not specific enough in many areas for people to agree in the future that the goal has been accomplished or that significant progress has been made. It appears that most of the Measures that have a specific, measurable outcome are from other plans or initiatives. There is a need for the Measures of Success to be measurable and timebound if the Water Strategy is intended to achieve more than other existing plans and initiatives.
3. The most important Measure of Success would be to improve on existing state efforts to manage water budgets in each aquifer and stream. The current tool falls short of establishing a connection between permitted water use and historic and current groundwater elevations and/or stream flows that is easily understood by the public. Additionally, with respect to cold water fisheries, temperature should be monitored and correlated with withdrawals and stream flows.
4. The Strategy is mute on many developing issues, yet talks about Asset Management, sustainability, and the need to apply these principles to our water resources in order to take full advantage of the economic advantages offered by our abundant resources. By definition, Asset Management is a process of prioritizing needs by multiplying risk factors times failure impacts. Ignoring developing, low-risk, high impact issues such as hydrocarbon transport, fracking, or invasives that are near but not here (yet) is inconsistent with language like Asset Management and sustainability, and subtract from the document's credibility.
5. It may be counter-intuitive, but perhaps worth considering that recruiting sustainable water intensive industries might be more viable economically than the suggestions to foster innovative new water technologies. The latter is normally a strategy of water-poor regions or countries. Two examples of sustainable water intensive industries are renewable energy from wave action and semiconductor fabrication.

This office is committed to continuing over 40 years of local leadership as suggested in the document, through implementation of the most progressive stormwater management regulations in the state while meeting with individual developers on every project to identify ways in which these regulations can save costs. We are also committed to a long list of best practices and educational outreach, including continued implementation and monitoring of green infrastructure in road Rights-of-Way for water quality improvement, a robust residential raingarden development program, and ongoing outreach and efforts to address agricultural soil and water conservation. Any areas where the State of Michigan is able to provide our office with additional support in the future as a result of the Water Strategy or other means will be greatly appreciated.

Thank you again for your efforts on the Strategy and for seeking feedback.

Evan

Evan N. Pratt, P.E.

**Water Resources Commissioner
Director of Public Works**

Office of the Water Resources Commissioner
Washtenaw County
P.O. Box 8645
Ann Arbor, MI 48107

<http://drain.ewashtenaw.org>

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[View Washtenaw County Drain PDF Maps](#)

(734) 222 6860

pratte@ewashtenaw.org

*Please consider the environment before printing or copying.
I'm using Century Gothic font because it uses 30% less ink or toner.*

From: Phil Bednarek
To: mi-waterstrategy
Subject: Michigan's Water Strategy
Date: Wednesday, August 26, 2015 2:30:00 PM

Hello,

I just wanted to comment on your 30 year study. Personally I have been in the water industry for the last 30 years and a member of the Michigan Ground Water Association. My experience on the board and an advisor have given me a great deal of understanding of what we need in our state. We have worked with the Health Department and the DEQ on many occasions.

My main concern is the general language used to describe policy and future projects. Obviously anytime the state needs to add new ideas and time spent, it will cost money. So a revenue source is needed. What we don't want to see is the right of home owners taken away. They have the right to the water below them. This have been confirmed in the courts already.

The other area of concern is the possibility of a future taxation (or user fee) of groundwater in private wells. This is the people's water, state controlled, but still the people of our state own it. Please don't consider taxing an item that you really don't have any direct testing, control, or understanding of. Not to mention it is not a part of your infrastructure. After all, it isn't exported and never to return.

Surface water is an area that needs to be protected. Tourism and natural beauty must be preserved. Industrial abandoned polluted property needs attention as well. Otherwise no one will want to see or come and buy property. (Detroit needs this attention the most, but payback is best in western Michigan).

Please keep the Michigan Ground Water Association on your invite list for any future meetings when more details are discussed. George Carr is our lobbyist and we would appreciate your contact with him as well.

Thank you for your time.

Phil Bednarek

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From: [Pat Staskiewicz](#)
To: [mi-waterstrategy](#)
Subject: Public Comments to Water Strategy
Date: Wednesday, August 26, 2015 2:39:14 PM
Attachments: [Comments to Water Strategy 8-26-15.pdf](#)

Attached please find comments to the Water Strategy.

Thank you,

Pat

Patrick J. Staskiewicz, P.E.
Public Utilities Director
Ottawa County Road Commission
PO Box 739, Grand Haven, MI 49417
(616) 850-7208 Direct Office
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Ottawa County Road Commission

14110 Lakeshore Drive
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August 26, 2015

Mr. Jon Allan
Director
Office of the Great Lakes
DEQ
P.O. Box 30473-7973
Lansing, Michigan 48909

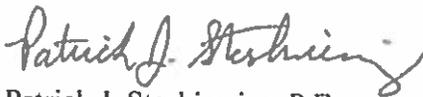
Re: Sustaining Michigan Water Heritage, A Strategy for the Next Generation

Dear Jon:

Attached please find my comments to Michigan's Water Strategy. I am very pleased that the Office of the Great Lakes has taken on this strategic planning effort and I think you have done a wonderful job in leading the OGL. It was a difficult task to balance all of the competing voices for how to shape the Water Strategy. While I may not agree with everything in this report, I do agree with the need for all of us to work together to find common ground and to protect and sustain Michigan's most valuable resource; water.

The implementation of the Water Strategy will require financial support from the State and its residents. If there is anything that I can do to lend a voice of support, please feel free to contact me.

Sincerely,



Patrick J. Staskiewicz, P.E.
Public Utilities Director

Attachment

Page 13. *Achieve a 40% phosphorus reduction in the western Lake Erie basin.*

I believe this is a good goal that should help in addressing toxic algal blooms in Lake Erie, but there must be a combination of point and non-point reductions for this to be fair and effective. In other watersheds, the MDEQ has only implemented point source solutions despite evidence that the problem is more widespread.

Page 23. *Develop and implement a uniform statewide sanitary code that is flexible and provides standards for site suitability based on risk.*

I like this long overdue recommendation and support all of the On-Site Wastewater Systems recommendations!

Page 37. *Establish voluntary water efficiency targets for all major water sectors to reduce water use impacts and costs.*

The Water Use Advisory Council provided recommendations for many water conservation and efficiency issues. I am pleased that many of these have been incorporated into the Water Strategy. However, one important recommendation, WC 5.1: *Michigan should adopt state-specific goals and objectives for its Water Conservation and Efficiency Program*, appears to be missing. Perhaps the recommendation on page 37 for establishing voluntary water efficiency targets was intended to address this deficiency, but it's not apparent based on the description. The Compact requires States to establish water conservation and efficiency goals and the current goals are generic and need to be tailored to the State of Michigan.

Page 42. *Water's cost is determined by volume-based pricing that allows the collection of revenues to pay for infrastructure and operations used to deliver water. Under this scenario, there is often a lower per unit, usually gallons, fee on water for higher volume users and amounts.*

While I agree that a tiered water rate has been used by some utilities, I think using the word "often" overstates the use of tiered pricing.

Page 44. *Evaluate current community practices regarding providing water to financially distressed customers to ensure all citizens have affordable access to water for drinking and sanitation.*

While I agree that society as a whole should support the less fortunate and provide financial assistance to those in need, I don't believe that the water or sewer utility is the mechanism to achieve this goal. The State already has programs and support staff that provide assistance to the poor through tax breaks and direct financial assistance. If there is a need to expand this assistance to include utilities bills, then the State should pursue this goal. A water utility is set up to charge the actual cost to treat, transport and maintain the water facilities and all users pay rates and charges based on these actual costs. We should not establish rates based on the ability to pay or the whole utility rate structure will collapse.

Page 44. *...nonpoint source discharge elimination standard (NPDES) permit;*

This should be National Pollutant Discharge Elimination System as stated on page 76.

Page 46. Figure 2. Michigan – Statewide Enterprise for Stormwater, Drinking Water and Wastewater Management.

A line needs to be added from the private debt service expenditures back to the private market bonds to show repayment of the bonds, just as it is shown to service the payments to the revolving funds.

I'm not sure if asset management needs its own box for expenditures. The labor to create and manage the plan will be covered under a utility's operation and maintenance budget and the recommended improvements coming out of the asset management plan will be included in a utility's capital expenditures or operation and maintenance budget, depending on the size of the asset.

Page 54. Retain full authority under the Clean Water Act to continue to manage Michigan's own water resources.

In addition to the Clean Water Act, the Safe Drinking Water Act and the Clean Air Act are other important Federal acts impacting the management of Michigan's water resources. Perhaps this goal should be restated to be a broad recommendation to "retain primacy over all federal regulations impacting water (Clean Water Act, Safe Drinking Water Act, Clean Air Act, etc.) to continue to manage Michigan's own water resources." However, the State needs to step up and support the MDEQ and other agencies and provide the funding needed for primacy from the general fund and not continue the practice of funding regulatory oversight through fees.

Page 58. Water Strategy Implementation Plan

The majority of the goals have the MDEQ as the lead actor. Given the MDEQ's dwindling budget, I am concerned with their capacity to implement the plan. I think Goal 6.5 should be moved up or the goal should be split into a short and long term funding strategy.

From: Mangus, Amy
To: mi-waterstrategy
Cc: Karl, Kelly C; Evan Pratt; Chuck Hersey
Subject: SEMCOG Water Strategy Comments
Date: Wednesday, August 26, 2015 2:47:32 PM
Attachments: SEMCOG Water Strategy Comments.pdf

Thank you for your consideration of the attached comments.

Amy Mangus, Manager
SEMCOG Plan Implementation
313-324-3350



1001 Woodward Avenue, Suite 1400
Detroit, MI 48226
Main: 313-961-4266
Visit: www.semco.org



August 26, 2015

Jon Allan, Director
Office of the Great Lakes
Michigan Department of Environmental Quality
P.O. Box 30473-7973
Lansing, Michigan 48909

RE: State of Michigan Water Strategy Comments

Dear Mr. Allan,

The State of Michigan Water Strategy can play a significant role in protecting and restoring our water resources in Michigan. We specifically appreciate the connection and encourage continued linkage between the economic, social, and environmental benefits that a healthy water system provides to our state.

SEMCOG is a regional planning partnership of over 165 governmental units serving 4.7 million people in the seven-county region of Southeast Michigan striving to enhance the region's quality of life. SEMCOG is also the designated water quality planning agency for Southeast Michigan. The goal of these comments is to assist in the final development of a Water Strategy that will lead to effective implementation throughout the state and region.

With the region's current priorities in mind, SEMCOG convened a regional group of infrastructure and stormwater experts to develop a comprehensive set of comments for your consideration. At the same time, we have reviewed and support those comments submitted by other agencies within our region in addition to those comments submitted by the Michigan Water Environment Association.

Thank you for the opportunity to provide comment. We would welcome the opportunity to meet with you to review and discuss any of the recommendations contained in the attached comments.

Sincerely,



Kathleen Lomako, AICP, CAE
Executive Director

State of Michigan Water Strategy Comments August 26, 2015

Overall Comments

- A vision is an important element to guide the Water Strategy. We suggest that the vision be unique to Michigan that includes linking the economic and social vitality associated with being the Great Lakes State. For example, “Michigan capitalizes on its unique water resources to support economic prosperity, provide recreation and cultural opportunities for residents, and protect water resources for future generations”.
- The individual recommendations should focus on actions that are specific and help implementation activities. For example, rather than a recommendation to develop tools and guidance related to shoreline and riparian ecology, a specific recommendation that would assist local implementation would be “increase tree canopy along riparian corridors” and “support local efforts to prioritize restoration of shoreline and riparian ecology”.
- Additionally, the document should identify priority actions that can be taken in the next 24-36 months. The actions should be specific as to timeframe and participants. By way of example, one of the Goals under the Water Strategy is: “*Michigan invests in infrastructure and supports funding to maintain clean water and healthy ecosystems.*” (Chapter 6). The recommendations, however, are very general, such as: “*Establish sustainable mechanisms to achieve Water Strategy goals including water infrastructure management.*” Keeping the long-term Goal is fine, but we strongly encourage replacing the generic recommendations with specific, priority actions. In this case, we recommend a priority action of, “*The Executive Branch and departments will assist and support municipal efforts to introduce legislation authorizing the formation of stormwater utilities and the collection of stormwater management fees. Time frame for action is Calendar Years 2015 and 2016.*”
- It appears that some significant water-related issues could use additional discussion in the strategy, including: combined sewer overflows, sanitary sewer overflows, habitat protection and restoration, terrestrial invasive species, utilizing technology such as GIS to aid in decision making, the importance of maintenance (e.g., green infrastructure maintenance, maintaining habitat restoration areas) and the inter-related connections of all the infrastructure (water, sanitary, storm, transportation) to water quality. There are many challenges and opportunities associated with both urban and agricultural watersheds. These priority issues, such as the role of stormwater runoff in both types of watersheds, needs to be better emphasized and should be discussed earlier in the strategy.
- The 30 year vision outlined in the Water Strategy is achievable only if it includes an implementation framework. The state strategic planning process provides an available tool for developing this framework. We recommend that state agencies update their strategic plans to include performance goals and objectives, key outcomes, and agency-

specific priorities consistent with the vision and priorities of the Water Strategy. The plans should cover a planning period of two to five years with regular updates, and identify metrics for measuring and reporting progress toward achieving the identified goals and outcomes. The strategic plans also can serve as the foundation for intra-departmental work plans and individual performance measures for management and staff.

Chapter Comments

Chapter 1: Protect and Restore Aquatic Ecosystems

- While the section does discuss stormwater runoff, a more concrete description of the issue would be helpful. For example,
 - *In addition, other hydrologic modifications like storm water infrastructure and extensive impervious surfaces contribute to less infiltration and increased surface water runoff and flow, resulting in increasingly “flashy” streams. The excess surface water runoff combined with the sediment and nutrient loading leads to water quality degradation such as decreased dissolved oxygen and sediment deposition within the stream channels. These changes in the water quality lead to a decline in the benthic population on which the fish population is dependent. Additionally, the loss of infiltration with the extensive impervious cover can reduce vital recharge of aquifers and reduce base flow to streams. In rural areas, infiltration to deeper depths is interrupted by tile drains designed to conduct water away from fields. These changes can pollute receiving waters, impact aquatic life that depends on groundwater-fed streams during summer months, and affect human groundwater use.*

Reduce occurrence and Impacts of Harmful and Nuisance Algal Blooms

- The strategy should discuss the impacts of algae blooms in general and the recreational problems that occur and not focus entirely on the harmful part of algae blooms.
- Support funding alternatives to address sediment removal / maintenance needs of existing stormwater infrastructure and best management practices (since deposited sediment in stormwater BMPs and pipes can be a source of nutrient releases).
- Reference what has been done already to monitor drinking water intakes from the Huron to Erie corridor. This should include a recommendation here or in the monitoring section to recommend monitoring of intakes, as well as recommending enhanced monitoring of priority subwatersheds tributary to Lake Erie.

Integrate Water Knowledge into Local Land-Use Planning

- The “Integrate water knowledge into local land use planning” needs to discuss broader issues such as stormwater and green infrastructure, not just wet weather extremes.
 - Develop a list of “concrete” zoning ordinance recommendations that lead to a reduction in stormwater runoff volume and pollutant loading.

Build Resiliency into Riparian Systems

- There should be more concrete recommendations under riparian systems, such as increase tree canopy. Riparian system should also discuss the important role they play in linking

the water resource system and green infrastructure network and a recommendation on public ownership for multiple uses. (e.g., biking, kayak access). Minimize mowing and removal of riparian vegetation.

- Prioritize riparian corridor enhancements by aligning multiple outcomes of communities and counties. Define where recreation is most desired and focus on those areas for riparian corridor enhancements (in addition to runoff management, etc). Identify/prioritize areas along riparian corridors for increasing tree canopy.
- Promote invasive species control for riparian invasives such as *Phragmites australis* and *Japanese Knotweed*.

Restore Hydrologic Connectivity

- Prioritize the dams that are viable for specific purposes vs. those dams that are no longer viable. Work with and encourage local stakeholders to develop an inventory of priority dam removal.

Manage Groundwater Withdrawals

- Determine if this is the section where groundwater withdrawals, as well as, diversions are discussed. The importance of the Great Lakes Compact should be included.

Improve Water Management in Urban Landscapes

- Under urban landscapes, include a recommendation to increase tree canopy in urban areas where it is less than 20 percent. Include a discussion on the connection increasing tree canopy and the improvement in water quality and opportunities in downtowns, waterfront areas, and as a part of economic development (people will visit more and spend more in areas with good tree canopy, etc.,)
- Discuss the importance of green infrastructure and a recommendation focused on constructing green infrastructure equivalent to 10% of the total impervious cover that manages at least the 90th percentile non-exceedance event. This will lead to significant reductions in stormwater volume and pollution loadings.
- Update the road recommendation to be more specific focusing on developing local, county and state policies, standards, and guidelines to integrate GI into transportation infrastructure.
- Collaborate across transportation agencies to support state, county and local roadway planning approaches that integrate local water resource goals.
- Support development of consistent approaches for alternative street design standards.

Improve Water Management in Rural Landscapes

- Develop a coordinated approach across state agencies, MDA, MDOT, MDEQ, MDNR, etc. to identify and prioritize wetland restoration opportunities within agricultural areas.
- Develop a funding mechanism that achieves multiple outcomes: runoff management for the local farmers; runoff management for the local water resources; wetland restoration and reconfiguration of tile drains, (tile drain management), etc.
- Under agricultural, discuss CAFOs and have recommendations that discuss tile drain management, use of filter strips/constructed wetlands, and the need to partner between the agricultural communities and others on implementation.

- Habitat restoration/terrestrial invasive species should be discussed.
- Need to discuss the important role coastal wetlands play. Align u/s runoff management with priority coastal wetlands.
- Seems overly focused on Lake Erie. That's the only area where a phosphorus reduction is recommended?
- Discuss the importance of preservation of high quality, unique areas (e.g., St. Johns Marsh, Delta area, Coastal wetlands, cold water streams)
- Public lands and green infrastructure should include a maintenance plan.

Chapter 2: Ensure Clean and Safe Water

The 3rd paragraph in introduction shouldn't imply that the solutions are only regulatory. The strategy should acknowledge the important role incentives play in clean water.

Protect Drinking Water Supplies

- This section should focus on all the sources of drinking water across the state, not just groundwater. But within the groundwater discussion, there should be some data about numbers of municipal drinking water wells that serve X population across the state. The description is very focused on problems. It would be helpful to start off with a discussion about the how much of the population in Michigan relies on municipal wells vs private wells and also how much of the population relies on the Great Lakes. The first paragraph isn't entirely clear on this data.
- Nitrate is a discussion in this section, but not listed in the overall description in 2nd paragraph of all the challenges.
- Need to include discussion about well-head protection programs for municipal areas and recommending actions that can minimize contamination within those sensitive areas.
- In addition to groundwater supplies, the important role of surface water and drinking water should be discussed. It should also include a discussion of monitoring of these intakes as well as a recommendation on coordinated spill prevention and response.

Properly maintain on-site waste water systems

- Identify existing and needed sewerage disposal facilities for septic system contractors to ensure adequate coverage across the state. Use incentives and innovative solutions to provide needed coverage across the state.

Clean up Legacy Contamination

- Discuss the thought process resulting from a generic recommendation like "cleaning up contaminated sites" absent any big picture context. For example, over emphasis on clean up may very well lead to under emphasis on investment in actions that prevent the perpetuation of new contaminated sites or other investments that produce more bang for buck in reducing risks. Recommendations worded like this are incongruous with the bigger picture, systematic approach sought in the strategy. We suggest a careful review of each recommendation to assure the overall context is clear . and consistent with a systems approach that focuses on investing where benefits are greatest in proportion to costs, both short term and long term.
- Discuss prioritizing clean up in areas with highest recreational opportunities, economic opportunities, etc. Include information on the legacy contamination impacts to

groundwater and surface water, including data on the number of sites. Include a discussion on the importance of cleaning up contamination in riparian areas along newly formed water trails.

- Aren't there any recommendations about alternative funding sources and aligning priorities to obligate other sources of funding, etc.?

Prevent Environmental Impacts from Emerging Contaminants

- Include a recommendation regarding public education campaign about collecting and disposing of these chemicals at local hazardous waste collection sites.

Other topics that should be included in this chapter include:

- This chapter should include some discussion about CSOs/SSOs
- The 2nd paragraph of this chapter talks about runoff as a challenge, but no where else in the chapter are there any related recommendations...so consider the following:
 - Use of vacant property and certain public property to filter stormwater
 - Stormwater as a major pollutant source

- Include public education campaign – OVERALL about the importance of clean safe water, etc.

This chapter should have information focusing on the high quality natural resources in the state and the importance of preserving these resources in order to have clean and safe water.

- Habitat restoration/terrestrial invasive species should be discussed. – if this topic is expanded on in the first chapter, then this chapter could include a reference to the first chapter with a brief discussion about the connection to clean and safe water.

Chapter 3: Create Vibrant Waterfronts

- This chapter is an essential component of the Water Strategy. As such, additional background information regarding recent initiatives and recommendations should be included. For example, consider including information and recommendations aligning economic development strategies to include waterfront development and blue economy initiative. Give examples of the positive programs happening in the state.
- Include information on how state funding such as the Coastal Zone Management program can focus on waterfront issues and planning.
- Align the state water strategy goals with organizations that can help smaller coastal communities. Michigan Municipal League; County Associations; township associations; local economic development organizations, and regional councils.
- While algae blooms, invasive species, etc., should be discussed elsewhere in this strategy, a connection to these issues should be made in this section. In the past, there has been significant economic issues related to algae blooms, etc., as part of waterfront industries.

Chapter 4: Support Water Based Recreation

- Include a discussion about the need to align local water based recreation priorities with environmental priorities. For example, align priorities for wetland and habitat restoration in areas targeted for certain recreation activities. This allows for strategic investment of limited resources.

- Also, include information on the link of the knowledge based workforce/ attracting/retaining the workforce and water based recreation.
- Include recommendation to design water based recreation to meet the widest range of people as possible.
- Discuss the value of Pure Michigan and the need to market our assets nationally, regionally and locally.
- The Michigan Natural Resources Trust fund should include public access to water as a priority in funding acquisition projects and the inclusion of water based recreation as a priority for development projects.
- Inventory of recreational water based recreational opportunities available through community recreation plan development.
- Include the importance of being able to link water based recreation areas by multiple modes, such as ensuring these areas are available by transit and nonmotoried transportation systems.
- Include the access recommendation that is stated in the Public Land Strategy that there should be public access every 5 miles as well as every mile in the Southeast Michigan region. It should also acknowledge increase access for kayak use.
- Both riparian and aquatic invasive species can degrade water-based recreation. Riparian invasives can prevent access to water for recreation and aquatic invasives can reduce the quality of the experience.

Chapter 5: Promote Water Based Economies

- Include more background on the economic value of water based recreation with recent studies. Also, discuss local initiatives that have been successful in Michigan and Michigan's leadership role in Water Trails across the country (and that we have 2 water trails that have received national water trails designation).
- Include recommendations highlighting the need for water based events, as well as innovative partnerships.

Chapter 6: Invest in Water Infrastructure

Introductory Section

The introductory section seems to imply that water infrastructure is focused on drinking water conveyance with the early discussion about water rates. However, the graphic for the chapter shows a storm drain. This section should highlight that water infrastructure includes any infrastructure that collects, treats, conveys, transports, discharges water, wastewater and stormwater to include all the pipes and appurtenances along with the transportation network that isn't conventionally considered a water conveyance mechanism.

It may be helpful to include a graphic depicting the water infrastructure cycle. The graphic could depict a typical surface water source/water treatment plant conveyed to a business or residential area followed by discharge to the sanitary system and conveyed to the WWTP followed by discharge back into the Great Lakes. Additionally, the graphic should show the stormwater conveyance from properties to local creeks and to the Great Lakes. All of these systems are part of the "water infrastructure".

Overall, the chapter should have a strong focus on the investment need for water infrastructure, including water, sanitary, transportation network and stormwater management. Green infrastructure should be reflected as a method to extend the life of the hard infrastructure systems and supports long-term cost benefits. Additionally a discussion about the importance of aligning infrastructure improvements to take place together rather than independently will lead to significant long-term cost savings. For example, roadway projects should also include other needed infrastructure upgrades such as water, sanitary and stormwater.

Improve Understanding of True Cost of Water

- The first paragraph of this section should clearly reflect that the cost on a water bill reflects, not just delivery, but also collection, treatment and maintenance. So much discussion about a “free” resource overwhelms the intent of the paragraph to highlight the need to pay for the collection, treatment and delivery through an elaborate system and network of pumps, pipes and treatment systems.
- Reference the types of municipal water supplies – groundwater vs. surface water in the second paragraph. The second sentence in this paragraph seems out of place with the intent to highlight costs associated with “commodities and services”.
- Again, reference water utilities to include water, wastewater and stormwater.
- There is too much discussion about a “commodity price or charge” for water when it isn’t a recommendation and the chapter itself dismisses it as an alternative. Recommend shortening the description on this option and focusing more on the need to supporting efforts to define the true cost of service (water/wastewater/stormwater) in addition to exploring new approaches to financing stormwater management.
- This entire chapter lacks any discussion about fracking and the associated effects of permanently removing significant quantities of water from the overall water cycle. Additionally, the conveyance of hydrocarbons via pipelines and the interconnectedness to our water systems is an important component. The challenges associated with radioactive fracking waste and potential impacts to Michigan’s water resources should be clearly delineated with recommendations for consistent approaches for local transparency, safety, emergency response and accountability.
- The 1st recommendation talks about linking water to other amenities, but the entire section does not have any discussion about the other amenities.
- The 2nd recommendation is very vague. There should be reference to supporting a true cost of service approach for all water infrastructure in addition to making reference to evaluating and supporting development of alternative financing approaches for stormwater management infrastructure.
- The 3rd recommendation seems inconsistent with the lengthy discussion about implementing a “commodity charge” on water. Another reason to minimize that discussion in the section.

Invest in Water Infrastructure

- Include a more holistic discussion of water infrastructure, to include water, sanitary and stormwater.
- Talk about an “integrated systems approach” early on and describe what that means.

- Highlight the challenges of dealing with stormwater infrastructure and financing either in this section or the previous section in order to adequately recommend “evaluate and support alternative financing approaches and legislative options to dedicate a funding stream for stormwater management infrastructure”

Develop an enterprise budget

- Since this section is clearly focusing on water, sanitary and stormwater infrastructure, this should also be reflected in the earlier sections.

Chapter 7: Monitor Water Quality

Introductory Section

The introduction should describe clearly what it means to monitor water quality and water quantity. With all of the discussion about drinking water previously, the average reader may infer the discussion to be focused on drinking water.

What is typically monitored from a water quality vs. water quantity standpoint? Describe in general terms the types of water quality parameters that are monitored to support recreational and economic development opportunities. Differentiate between monitoring the resource vs. state permit programs that require monitoring discharges/outfalls. Describe how these approaches are interconnected and support the overall goals.

Build Integrated Outcome-Based Monitoring

Include discussion about the types of federal, state and local monitoring programs. Also include discussion about the importance of watershed groups and local volunteer monitoring programs. Highlight how local volunteer programs can support and meet the intent of state programs and this outcome-based approach.

Integrated means including the overall approach and accompanying pieces to achieve the state goal of being fishable, swimmable, etc. This section needs to describe the varying pieces and partners collaborating to achieving the overall goals. Linking this integrated approach to the Water Strategy’s introductory focus of an “ecosystems” based approach. Ecosystem-based from a monitoring standpoint should include discussion about achieving water quality standards, but specifically identifying those goals from a biological standpoint and how to get there. Aligning the biology achievable goals for fish/macro, etc. with the parameters that need to be monitored can then better define the action items for achieving that goal.

As an example of an ecosystem-based approach, consider describing the connection between runoff reduction to reduced pollutant loading and stream flashiness and how that directly benefits the stream biology. In this example, outlining how stream quality scores and flashiness are linked helps to define the goal. Monitoring parameters can include the stream flow and macroinvertebrate populations. The action items are defined by the quantity of impervious cover that should be managed within green infrastructure. This supports a needed discussion about establishing runoff reduction targets by subwatersheds that will lead to achieving water quality standards. EPA funded and MDEQ supported the Water Quality Target Setting process that recommends specific runoff reduction targets needed in subwatersheds to work towards the

resource achieving water quality standards. It is an opportune time to highlight these connections.

A potential recommendation from this study could include, “Support efforts to establish runoff reduction targets within priority subwatersheds across the state leading to collaborative partnerships to implement stormwater management measures.”

Chapter 8: Build Governance Tools

- This chapter includes a philosophy that should be reflected throughout the previous chapters...highlighting that it isn't a topdown regulatory state approach that will achieve success, but rather this integrated approach from different entities, etc. This also should focus on the interconnectedness of the system and that it needs to be managed as such.
- Specifically, governance tools should include a discussion on:
 - Need for innovative partnerships And how the state can and must play a role in enabling them.
 - Prioritize state funding for activities to implement recommendations (e.g., meeting gaps in public access).
 - Prioritize state funding and technical assistance to strategically support alignment of local efforts looking at a holistic approach (i.e., where local communities/organizations desire recreation or desire focused attention on a particular stream/water resource, state agencies should identify where state funding can work towards these desired outcomes. Where are there wetland restoration opportunities? Where is state property located that may be utilized for particular purposes?, etc.,).
 - Promote coordination between watershed planning groups and transportation agencies that leads to a process of incorporating stormwater management into transportation projects.

Chapter 9: Inspire Stewardship

The Water Strategy should include the need for continued and coordinated public education campaign. This should go beyond K-12 education. It should also support efforts of watershed councils and watershed organizations that inspire stewardship locally.

From: [Sierra Club](#) on behalf of [Jere Greiner](#)
To: [mi-waterstrategy](#)
Subject: Public Comments on Draft Water Strategy
Date: Wednesday, August 26, 2015 3:15:02 PM

Aug 26, 2015

Director of the Office of the Great Lakes Jon Allan

Dear Director of the Office of the Great Lakes Allan,

Thank you for this opportunity to submit my comments on the Department of Environmental Quality's Office of the Great Lakes draft Water Strategy. I'm glad to see the agency understands the need to take a comprehensive, long-term look at stewarding our state's most precious resource. The draft Water Strategy is a good start and contains important initiatives such as a push for water conservation, but it needs clearer, enforceable measures to achieve its goals.

The Water Strategy relies too heavily on voluntary efforts and actions that "should" be taken rather than "will" be taken to protect our water resources. The OGL needs to develop a stronger vision statement and to put forth specific actions, verifiable goals and data-based solutions to get where we need to be in 30 years.

This is especially true regarding the goal of achieving a 40% phosphorus reduction in the western Lake Erie basin. The Water Strategy relies on voluntary measures to address agriculture's role in the problem, an approach that's been in place for years and hasn't worked, and promotes Michigan Agricultural Environmental Assurance Program practices that will not address the phosphorus problem. The state's approach needs to include much stronger actions, including a complete ban on the application of waste on frozen or snow-covered ground.

The Water Strategy recommendation for legislation to phase out microbeads is an example of a bold, specific and concrete action that would lead to an important improvement in our water quality and public health. The state's plan for Great Lakes protection needs more recommendations like this.

Finally, promoting water as "a strategic asset for community and economic development" is important, but it needs to be balanced with the basic human right of everyone to have access to clean water. A Water Strategy for Michigan needs to underscore this point by ensuring our water systems remain publicly owned and affordable to families for basic needs.

I look forward to your response about the changes you will be making in the Water Strategy to make it a strong document that will truly serve its stated mission of serving as "a roadmap to achieve a 30-year vision to ensure Michigan's water resources support healthy ecosystems, citizens, communities and economies." Again, thank you for this opportunity to share my input.

Sincerely,

Jere Greiner

[REDACTED]

[REDACTED]

From: [Willi Water](#)
To: [mi-waterstrategy](#)
Subject: *** Clinton River - Red Run ***
Date: Wednesday, August 26, 2015 3:26:48 PM

Hello,

LBrooksPatterson and OaklandCounty need to clean up their act. Combined Sewer Overflow discharges into Warren Michigan via the open channel Red Run cause huge issues of health, flooding, and ugliness.

Red Run flows into Clinton River and on to Lake St Clair, creating a Delta of sediment deposition by Harley Ensign Marina

Need more info :
Check out the Red Run blog

People who think the Clinton River is clean, swim in it, etc do not truly know what happens via underground Stormwater contamination and Sewage overflow

Willi G. Gutmann

From: [Ruth Cooley](#)
To: [mi-waterstrategy](#)
Subject: Grand River
Date: Wednesday, August 26, 2015 4:43:54 PM

I would like to see the Grand River in West Michigan dredged from Grand haven up river to Grand Rapids. In the olden days the river was used for travel and commerce but in the last 30 years , trash, old docks and bridge foundations have created sand bars and changed currents so the depth in areas is just too shallow to navigate.

Thanks.. Ruth Cooley

From: [Drummond, Charles \(C.\)](#)
To: [ml-waterstrategy](#)
Subject: Draft Water Strategy document comments
Date: Thursday, August 27, 2015 10:48:23 AM

I like that this draft does pay some attention to the issue of combined storm sewerage overflows, but I do not like that it doesn't seem to offer much in the way planned actions to correct the issues. I don't think we need more monitoring, or more ability to add chlorine to combined overflows as they occur, we need to correct the infrastructure so that overflows do not occur at the frequency that they currently do.

The thing that has puzzled me about this issue relates to the authority the state claimed with its use of Emergency Financial Manager legislation. In instances where EMFs are invoked, the state claims authority on the grounds that municipalities are a part of the state government. What is puzzling here and with the state's role in combined sewerage overflows in general, is that the state claims that it's not their problem, it's the municipality's problem. From my admittedly pedestrian point of view, this looks like the state claiming authority without consistently taking responsibility.

I understand that it will probably take Billions in funding and potentially decades of work to really fix these issues ... a Water Strategy document like this one is precisely the place to get this issue headed in the right direction. It should include a strategy for developing the route toward actually fixing these problems.

Charles Drummond



From: [Laura Haynes](#)
To: [mi-waterstrategy](#)
Subject: Sen. Pavlov comments
Date: Thursday, August 27, 2015 11:06:17 AM
Attachments: [Water Strategy Comments.pdf](#)

Attached, you will find comments from Sen. Phil Pavlov regarding the 30-year water strategy.

Please let me know if you have any questions.

Thank you,

Laura Haynes
Director of Constituent Relations and Community Resources
Senator Phil Pavlov
Michigan's 25th Senate District

517-373-5074

LHaynes@senate.michigan.gov



THE SENATE
STATE OF MICHIGAN

PHIL PAVLOV
25TH DISTRICT
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VICE CHAIR

August 27, 2015

Director Jon Allen
Office of the Great Lakes
P.O. Box 30473-7973
Lansing, Michigan 48909

RE: 30 year water strategy

Director Allen:

Thank you for providing the opportunity to comment on the Office of the Great Lakes' proposed 30-year water strategy. I appreciate the efforts that have been made to craft this draft strategy and the sincere interest that we all must take in protecting our Great Lakes.

As a Michigan legislator, I am duty bound by our state's constitution to protect our natural resources from pollution, impairment and destruction:

The conservation and development of the natural resources of the state are hereby declared to be of paramount public concern in the interest of the health, safety and general welfare of the people. The legislature shall provide for the protection of the air, water and other natural resources of the state from pollution, impairment and destruction.

With this charge in mind, let me offer the following commentary for inclusion in your thoughts as you review the draft further:

As the strategy introduction states: "Water defines Michigan." We are charged with a great responsibility to keep our Great Lakes, inland lakes, rivers and streams clean. As you indicate, we must do what we can to protect the Great Lakes basin by guarding against invasive species, protecting habitat, ensuring recreational access and improving drinking water quality, but that all hinges on keeping our lakes free from a needless risk of nuclear waste contamination.

The draft strategy lays out a large focus on keeping the water clean. It speaks of safe water being "fundamental to Michigan's economy and to ensuring high-quality places to live, work and play." As a leader in the basin, Michigan has a stewardship role in getting all states and

provinces to stand behind strong laws like our radioactive waste siting laws to avoid long-term permanent disposal of nuclear waste.

Consider Michigan's current laws regarding siting of radioactive waste facilities:

333.26210 Final siting criteria; establishment; minimum requirement.

Sec. 10.

The authority shall establish final siting criteria that at a minimum excludes a candidate site that is any of the following:

- (a) Located in a 500-year floodplain.
- (b) Located over a sole source aquifer.
- (c) Located 1 mile or less from a fault where tectonic movement has occurred within the 10,000 years preceding the effective date of this act.
- (d) Not sufficiently large to assure that an isolation distance of 3,000 feet or more from the disposal unit and adjacent property lines is available.
- (e) Has wetlands within the boundaries of the candidate site as defined in part 303 (wetland protection) of the natural resources and environmental protection act, Act No. 451 of the Public Acts of 1994, being sections 324.30301 to 324.30323 of the Michigan Compiled Laws.
- (f) An environmental area or a high risk area as defined in part 323 (shorelands protection and management) of Act No. 451 of the Public Acts of 1994, being sections 324.32301 to 324.32315 of the Michigan Compiled Laws.
- (g) A floodway designated under part 31 (water resources protection) of Act No. 451 of the Public Acts of 1994, being sections 324.3101 to 324.3119 of the Michigan Compiled Laws.
- (h) Located where the hydrogeology beneath the site discharges groundwater to the land surface within 3,000 feet of the boundaries of the candidate site.
- (i) Located within 10 miles of Lake Michigan, Lake Superior, Lake Huron, Lake Erie, Saint Marys river, Detroit river, St. Clair river, or lake St. Clair. This subdivision shall not apply to a site that is located at or adjacent to a nuclear power generating facility.

We must make sure that these same criteria are used to protect all parts of our basin and that all states and provinces take a similarly protective approach to our lakes. The fact that the proposed long-term nuclear waste facility lies within a half mile to the Great Lakes is deeply troubling to me and clearly violates the science-based buffer zone of ten miles that is contained in Michigan law.

The draft strategy also speaks to the issue of improper waste disposal and governance issues—let me say that both of these principles seem to be compromised by a failure to strongly advocate against the OPG proposal that will needlessly store nuclear waste near the world's most distinctive and critical sources of fresh water.

The Council of Great Lakes Governors is currently scrutinizing a proposed diversion of Great Lakes water to support use by the city of Waukesha in Wisconsin and we should be jointly taking a similarly critical view of the OPG proposal. If we all took such a view, my thought is that this proposal would and does put at risk the integrity of the health of the basin and the people and resources that depend on the lakes.

Thank you again for providing the opportunity to comment on this plan. I hope we can continue to work together to keep our waters clean.

Sincerely,

A handwritten signature in black ink, appearing to read "Phil Pavlov". The signature is written in a cursive style with some loops and flourishes.

Phil Pavlov
State Senator
25th District

From: [Sabrina Gross](#)
To: [mi-waterstrategy](#)
Subject: Public comments - Michigan Water Strategy Plan
Date: Thursday, August 27, 2015 11:11:23 AM

Thank you for your efforts putting together this plan. After reading the details, I have a few comments regarding missing information in the document. Specifically on Page 13, Table 2, page 60 item #18, & page 72.

I have served on the Huron River Watershed Council as a municipal representative, and also organized the Stormwater Management Committee in the township I live in.

The Strategy does not provide solutions for the excess waste that has occurred as Michigan shifts to industrial food production, particularly in the Western Lake Erie Watershed. Just as any industry has to figure out what to do with more waste, we can see directly the impact of what spreading dissolved phosphorus (P) and E Coli over & over on ground that is already saturated. It ends up in Lake Erie and drinking water.

Although small farms still exist in Michigan, (and Ann Arbor loves to boast about local sourced foods), the reality is that nearly all of the dairy, eggs & meat at grocery stores (from the mom & pop size to Costco), hospitals, restaurants, schools, and other institutions are all sourced from CAFOs. And this waste will continue to increase as food demands increase.

Revisions proposed:

1. Public health is threatened by Michigan's laissez-faire view of industrial waste from CAFOs.

The fact that **CAFO or animal production is not mentioned in the document** speaks volumes about this task force ignoring a major source of water pollution. Just as government has strict laws about waste disposal in other industries, the Strategy should include regulations & enforcement for the CAFO industry specifically. Only on page 21 is "manure" mentioned, and only as a source of nitrates. I would encourage the committee to visit the concentrated DRP effluent from lagoons being spread in Michigan communities.

2. The "Voluntary", "precision" solutions proposed on page 13* are **not** working. Despite record HAB & P levels in Lake Erie, Industrial Agriculture is not willing to revise their disposal of waste. MAEAP continues to recommend spreading of manure on frozen ground, although this is not a "best practice".

Table 2, Item 18 (page 60) should be revised to include: **At the minimum, banning the application of manure (animal waste) on saturated or frozen ground or when heavy rain is predicted, implemented statewide by 2016.**

3. Page 72 suggests that the culprit of Phosphorus loading is from municipal systems, yet experts state 80% of phosphorus loading comes from **nonpoint sources**, and 20% from point sources, & the EPA has documented little change in P discharge from Detroit

wastewater (point source) since 1992.

If Michigan is serious about reducing P, then an important solution is municipal grade treatment of CAFO waste to reduce phosphorus and other toxins in Great Lakes. One CAFO is equivalent to the feces/urine waste from a city the size of Kalamazoo. This waste runs off into Erie when spread continually on the land.

The statement on page 72 should be revised: "Increasing technology innovation capacity in treatment technologies to reduce phosphorus loading from municipal systems **and requiring municipal grade treatment of waste generated from Concentrated Animal Feeding Operations by 2020.**"

*Text from page 13: "These opportunities include promoting changes in the use of phosphorus through mechanisms like the 4R Program (Right Source, Right Rate, Right Time, Right Place), implementation of the Michigan Agriculture Environmental Assurance Program (MAEAP) suite of practices, restoration of grasslands and wetlands, use of vegetative filter strips, and use of technologies like precision farming and implementing no-till and conservation tillage techniques to reduce run-off. " **The 4Rs are not being enforced.**

Thank you for your public service.

Sabrina Gross

[REDACTED]

[REDACTED]

[REDACTED]

From: [Casey Steffee](#)
To: [mi-waterstrategy](#)
Subject: MAC Comments on Water Strategy
Date: Thursday, August 27, 2015 11:28:42 AM
Attachments: [image001.png](#)
[MAC Comments on Water Strategy.docx](#)

Good Morning!

Attached are the comments from the Michigan Association of Counties. If you have any questions, feel free to let me know.

Thank you,

Casey Steffee

Governmental Affairs Assistant
Michigan Association of Counties
517.372.5374 (office)
steffee@micounties.org



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Timothy K. McGuire, Executive Director

August 27, 2015

Michigan Department of Environmental Quality
525 West Allegan Street
P.O. Box 30473
Lansing, MI 48909-7973

To whom it may concern,

Michigan's waterways are crucial to the state's economy, job development and quality of life. Within that context, the Michigan Association of Counties (MAC) supports the proposed water strategy developed by the Michigan Department of Environmental Quality (DEQ). Several of the goals and implementation plans coincide with our internal policy positions for maintaining and improving Michigan's environment, including prevention of invasive species infestation, incorporation of environmental topics in education curriculums and development of a plan for the proper closure of wells.

While this is the case, it is critical for DEQ and the State of Michigan to fully fund any mandated activities related to implementation of the strategy. County governments are responsible for providing a multitude of other services that consume substantial shares of their budgets. An example of our concern is the recommendation for local public health departments to focus on their role as manager of county beaches. Establishing a sustainable funding source in order to carry out increased monitoring is necessary for this strategy to succeed.

MAC's members, the 83 counties of Michigan, stand ready to assist the State of Michigan in preserving and properly managing Michigan's natural assets, including its waters. With sound and responsible funding, Michigan's counties can be a major player in executing a strategy to advance this goal.

Thank you,

Casey Steffee
Governmental Affairs Analyst
Michigan Association of Counties

From: [Jay Richardson](#)
To: [mi-waterstrategy](#)
Subject: Comments on Great Lakes Water Strategy
Date: Thursday, August 27, 2015 11:35:59 AM
Attachments: [Water Strategy Review SWW 8.18.15.docx](#)

Attached are Sustainable Water Works (a Michigan 501(c)(3) water policy and technology organization) comments on the Michigan Draft Water Strategy. We are very supportive of this strategy and believe Michigan can be a leader in sustainable water development for the benefit of all citizens, visitors and businesses.

Jay Richardson
Sustainable Water Works!
248 767-2031



August 18, 2015

To: Michigan Office of the Great Lakes

From: Jay Richardson, Technology Principal
Sustainable Water Works, a 501(c)(3) Michigan Nonprofit

Subject: Draft Review of Michigan Water Strategy

The Michigan Water Strategy Draft for Public Review is a comprehensive and focused document on the role of water in Michigan's future. As we reviewed this document, we appreciate the wide range of current stakeholders from an ecosystem and quality of life perspective. Sustainable Water Works (SWW) believes future stakeholders can diversify Michigan's economy and make them a leader in natural resources sustainability. Retention of Michigan graduates, funding of Michigan university research, and increased economic development in the residential, commercial property and industrial businesses are essential for our future and we are positioned to be the policy and technology leader with implementation and funding of a Michigan Water Strategy.

SWW believes the ecosystem approach must be supported by targeted investment on 4-5 specific priorities for Michigan's future:

1. Eliminate known legacy pollution of rivers, lakes and Great Lakes AOC's in Michigan to support quality of life, recreation, residential, sustainable commercial and industrial development.
2. Manage stormwater runoff to mitigate nutrient, CAFO, industrial and CSO to maintain high quality potable and recreational water resources.
3. Restore and enhance watershed, riparian green infrastructure, fisheries to promote native fish (supporting a viable commercial fishing and recreation industry) and pollution monitoring.
4. Leverage Michigan's academic, business, NGO and professional groups to focus on water education, outreach, opportunities and solutions to make Michigan a leader in water quality, access and availability for productive and sustainable use.

In reviewing the Strategic Actions, SWW has the following comments:

- Aquatic ecosystems are connected systems of surface, ground and infiltrated water requiring a systems approach that includes in situ remediation of legacy issues, biomimicry, bioremediation and other sustainable technology developments to eliminate water issues at their source.
- Clean and Safe Water is the basis of any water strategy which requires investment in water research, development and businesses, so the economic benefit of global use of these product, processes and technologies is Michigan.
- Vibrant Waterfronts – AOC cleanup and watershed restoration are the keys to creating the capacity to create waterfront development. Pure Michigan has established the tourist and business potential of Michigan shores, environmental restoration will provide for developer investment to expand this to places like Muskegon and Marquette.

- Water Recreation is more than access. It is eliminating the source of beach closures, establishing watersheds and estuaries for retrenching native species of fish and waterfowl, creating fisheries and aquaculture industry to replenish native species in inland and Great Lakes to support commercial and recreational fishing.
- Promoting the water economy is vital to Michigan's future. The Water Strategy should focus government, business, philanthropic and academic efforts toward solving the Michigan priorities using the strength of our universities to do targeted research, government, business and philanthropic investment to use public utilities, land, roads and private funding to implement replicable pilot projects that solve Michigan and global issues supporting business investment to manufacture these products here and export them as an economic growth strategy.
- Investment in water infrastructure is key to restoring water quality and the ability to cope with emerging contaminants such as toxins, pathogens, pharmaceuticals, hormones and biological agents. Maintenance of end of life facilities and replacement of water infrastructure is essential for growth. New processes and technologies can make facility and infrastructure replacement much more affordable, especially if it is provided by Michigan companies.
- Monitoring Water Quality is essential for health, safety and national security, but source control of contaminants to provide high quality water from surface and groundwater intakes is necessary. Monitoring should focus on control and modeling stormwater management, nutrient runoff and groundwater migration to understand and react to ecosystem dynamics.
- Building Governance Tools is important to lead and prioritize solutions for water issues, coordinate academic, nonprofit and business activity toward the most effective and productive approaches, and network key stakeholders to collaborate on implementation of the most promising best practices, technologies and processes.
- Inspire Stewardship for Clean Water is an important aspect to education and outreach of Michigan citizens, businesses and cities. Leadership in sustainable water innovation is important to the State's future, since economic growth happens where innovation happens.

SWW's comments are meant to be constructive on Michigan's Water Strategy as a roadmap for Leadership in water quality and ecosystem restoration. Here are some specific comments:

1. Reduction of agricultural phosphorous runoff by 40% is important, but there is no proven technology to accomplish this level. Supporting collaboration of farmers, watershed organizations, academic experts, design and engineering professionals and innovation entrepreneurs is important to stakeholder acceptance of water quality and cost effective solutions. Several Best Management Practices may be needed, so a range of pilot projects using consistent baseline, modeling and performance metrics are essential build the toolbox.
2. Michigan needs to expand economic development to sustainable water intensive industries such as commercial fishing, electronics manufacturing, indoor agriculture and aquaculture...etc.
3. A new investment paradigm is needed for natural resources that values the economic impact to Michigan's GDP. Manufacturing water technologies in sanitation, purification, stormwater management, watershed restoration, water recycling...etc. solve global water issues. Investment capital is needed to create businesses at scale that can produce and export successful pilot technologies and the ability to introduce these businesses to the world.
4. The Water Strategy should be funded through a focused natural resource economic development organization. This will require networking organizations who have a vested

interest in a robust water ecosystem from an environmental, commercial and utility perspective to translate the Strategy into a “business plan” with the appropriate “scorecard”.

5. Water is important to everyone in Michigan. Education and Outreach must be focused on every stakeholder group. Citizens are interested in clean potable water, recreational users focus on water quality in watersheds, rivers, lakes and the Great Lakes, commercial users need access and a clear future regulatory approach that insures water for beneficial use and uniform standards for discharge. Progressive regulation that require results, but promote innovation is much more conducive than a prescriptive approach that is inflexible toward new technology and processes.

Sustainable Water Works appreciates the opportunity to comment on the Michigan Water Strategy

Jay Richardson, Technology Principal
Sustainable Water Works

From: [Finnell, Emily \(DEQ\)](#)
To: [mi-waterstrategy](#)
Subject: FW: IWR of MSU Water Strategy Comments
Date: Thursday, August 27, 2015 12:57:57 PM
Attachments: [Bartholic-IWR Water Strategy Comments-Final-Signed.pdf](#)
Importance: High

Emily Finnell
Office of the Great Lakes | MI Department of Environmental Quality
PO Box 30473
Lansing, MI 48909
finnelle@michigan.gov
517-284-5036

From: Jon Bartholic [<mailto:bartholi@msu.edu>]
Sent: Thursday, August 27, 2015 12:33 PM
To: Allan, Jon (DEQ)
Cc: Finnell, Emily (DEQ); 'Cynthia Brewbaker'
Subject: FW: IWR of MSU Water Strategy Comments
Importance: High

Jon/Emily, Attached are IWR, MSU Water Strategy Comments. This Strategy is a great start in providing guidance for the future of Michigan's water resources! We look forward to working with you as the Strategy evolves and is implemented. Jon

Jon Bartholic
Director, Institute of Water Research
Michigan State University
East Lansing, MI 48823-5243
517-353-9785
bartholi@msu.edu

From: Cynthia Brewbaker [<mailto:brewbake@msu.edu>]
Sent: Wednesday, August 26, 2015 2:56 PM
To: Jon Bartholic
Cc: Lois Wolfson; Frank Ruswick; Laura Young
Subject: IWR of MSU Water Strategy Comments
Importance: High

Jon,
Attached is IWR of MSU Water Strategy Comments. Please send no later than Friday Aug 28 to (***since you are out all day tomorrow I would suggest sending it today to assure Jon Allan receives it on time***):

Jon Allan, Director, Office of the Great Lakes
allanj@michigan.gov

Copy to:

Emily Finnell, Senior Environmental Specialist
finnelle@michigan.gov

me, and whomever else you wish to send it to.

I am copying it to Lois, Frank and Laura in this email.

Thank you,
CB

Cindy Brewbaker
Executive Assistant
Michigan State University
Institute of Water Research
1405 S. Harrison Rd., 101 Manly Miles
East Lansing, MI 48823-5243
517-353-9709
brewbake@msu.edu

MICHIGAN STATE **U N I V E R S I T Y**

August 26, 2015

Mr. Jon Allan
Director, Office of the Great Lakes
Michigan Department of Environmental Quality
P.O. Box 30473-797
Lansing, Michigan 48909

Dear Director Allan,

Thank you for the opportunity to comment on the June 4, 2015, draft Michigan Water Strategy, "Sustaining Michigan's Water Heritage," (hereafter "Strategy"). The Institute of Water Research (IWR) at Michigan State University (MSU) offers the following comments and looks forward to a response to these comments and the final Strategy.

The IWR believes that the Strategy does a remarkable job undertaking a difficult set of tasks: 1) Articulating an underlying philosophy and policy approach to water resources management, 2) constructing a comprehensive conceptual framework to implement that philosophy, 3) identifying and evaluating necessary components within that framework, 4) determining program and policy gaps and necessary steps to fill those gaps, 5) setting priorities among those steps, 6) developing mechanisms to implement those priorities, 7) describing responsibilities for implementation, and 8) establishing metrics to evaluate successful implementation.



**College of
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The IWR therefore supports the Strategy as a whole. The following comments are organized as follows: 1) Noteworthy discussions that the IWR specifically supports. 2) Opportunities for leadership that should be addressed or improved in the final Strategy. 3) Thoughts on Motivation. 4) Comments on specific details of the Strategy. 5) Comments on the Strategy Implementation plan.

Noteworthy Discussions that the IWR Specifically Supports

The IWR views the Strategy as an opportunity for leadership on water management issues. To that end, the Strategy is successful with respect to, and the IWR specifically supports, the following:

1. The Strategy's vision and overall operating philosophy. The IWR agrees that leveraging the benefits of water and sustainability is "critical to advancing Michigan's prosperity" as is, crucially, the recognition that Michiganders are "part of the ecosystem" (1)¹. We also agree with identifying economic, environmental, social and cultural factors as four core values. (1). Importantly, these four values need to be balanced on an on-going basis. The discussion of any significant decision made during implementation of the Strategy should explicitly address how these values were balanced in that decision.

¹ All parenthetical numbers reference page numbers of the Strategy. Thus "(1)" should be read as "page 1."

2. The importance of durable relationships and collaboration among the myriad actors necessarily involved in implementing the Strategy (e.g., 3).
3. The central role of, and the need to encourage, stewardship in water management (4).
4. The identification of the role for near term/on-going actions and long term cultural/attitudinal shifts. The IWR strongly endorses this as an appropriate approach to water management. We suggest that the significance of this approach be more explicitly recognized in the beginning of the Strategy.
5. The comprehensive explanation throughout, that describes how water fits into our lives.
6. The recognition that "the development of a robust and effective water management program...will be an ongoing, iterative process" (16). While this characterization is explicitly afforded to the Water Withdrawal Assessment Process, it accurately describes essentially all water management issues, and indeed the entire evolving relationship of humans to the rest of the natural world.
7. The insightful and helpful discussions of the "true cost of water" (42 - 43) and "enterprise budget" (45 - 46).
8. The necessity of, and need to invest in, monitoring (48 - 50). The IWR specifically applauds the recommendations to improve and increase monitoring for groundwater quantity and quality. We note, however, the Strategy calls for the implementation of a long term monitoring approach before funding sources are secured. As with other aspects of the Strategy highly dependent upon funding (see below), the failure to be more specific about funding sources calls into significant question the ability to implement this approach.
9. The Strategy's approach to and, relative to most strategy papers, detailed discussion of implementation. The following are specifically noteworthy:
 - a. The creation of the interdepartmental water team (54). The IWR highly recommends that two crucial details of this team be included in the final Strategy: 1) The team should consist of sufficiently high ranking officials to ensure broad perspective and adequate authority to ensure decisions are implemented. We recommend that department Deputy Directors be the appointed members of this Team and that they personally participate. 2) The specific commitment to form, and significantly involve, an advisory group of non-governmental personnel to assist implementation.
 - b. The Water Strategy Implementation Plan in Table 2 (58). Since this is a Five Year Plan, we encourage adding a description of how this five year increment fits into the 30 year span of the Strategy. For example, how will progress over the first five years fit into evaluation of whether and how to modify the Strategy over the next five year increment. This is especially important for those Strategy components that are necessarily adaptive. See, e.g., the discussion below of voluntary approaches to conservation.

Opportunities for Leadership that should be Addressed or Improved in the Final Strategy

There are several opportunities for leadership that the Strategy misses. These should be addressed in the final Strategy:

1. Identifying and proposing funding for the Strategy's work. The Strategy contains only a non-committal discussion of water as a commodity and a water fee (43), very general reference to a public education campaign as a precursor to a funding discussion (43), so-weak-as-to-be-a meaningless recommendation (45) and merely a hopeful implementation step (67). Given the imperative of funding implementation, ideally the Strategy should propose a specific mechanism to fund its recommendations. At a minimum, the Strategy should identify the advantages and disadvantages of specific funding alternatives and a process for the State to decide among those alternatives and adopt the selected approach. With respect to a preferred approach, see the further comment on this point in Item 6 below. It is highly unfortunate that the Strategy has failed to take this approach so that public comment could focus on the decisions surrounding the complete necessity of funding. The IWR is concerned that without a bona fide approach to the funding issue, the Strategy, despite its many strong qualities, will be perceived as and tend toward the good intentions rather than action end of the public policy continuum.
2. Being explicit on the issue of climate change. Because it contains only highly veiled references to the projected effects of climate change in Michigan (11, 59), the Strategy is effectively silent on this issue. While the IWR recognizes the unfortunate public division on climate change – but most certainly not among the scientific community – it is precisely because of that division that the Strategy should have, and to date has missed, an important leadership role. This omission should be corrected in the final document.
3. Providing necessary citations. The IWR recognizes that the Strategy could be bogged down by pervasive citations. However, citation support should be provided both for such things as significant conclusions/recommendations on emerging issues – such as to ban microbeads (25) – and fundamental factual statements upon which major conclusions rest – such as the status of water conservation efforts underlying the voluntary approach to agricultural conservation (39).
4. Describing a comprehensive approach to conservation. The Strategy's approach to water conservation is piecemeal, disjointed and incomplete. Rather than disparate discussions for different users (e.g., agriculture, industry, municipalities, domestic users), the Strategy should contain a unified discussion that describes an overall philosophy and policy approach to conservation of Michigan's water resources.
5. Recognizing the need for meaningful evaluation of voluntary approaches (37 - 39). The Strategy supports voluntary approaches to many important behavioral changes. See, e.g., control of nonpoint pollution (18) and conservation (36-38). While the IWR does not fault this approach per se, we believe that it needs to be part of an iterative approach that measures its effect, evaluates the need for modification and makes changes appropriately. The Strategy does provide a nod to such an adaptive approach (54), but more detail, especially specific desired outcomes and evaluation/modification processes, would provide greater assurance.
6. Providing consistent approaches to responsibility/accountability. The Strategy should take a consistent approach to identifying which parties create externalities imposing costs on others and which parties benefit from positive conditions, and therefore who has responsibility for changing behavior and/or incurring costs. As an example, the Strategy recognizes that infrastructure

maintenance need to be within business models of maritime companies (28), but fails to assign some responsibility for sedimentation creating some of those costs in that commercial context, while it does so in the similar recreational one (32). From a broader perspective, since all Michigan citizens benefit from a healthy and robust hydrologic system, and indeed impose burdens on it, all Michigan citizens should share in the costs of providing that system.

7. Providing adequate implementation metrics. The IWR recognizes lower priority recommendations described in Table 3 (70). But the lack of any metrics for progress on these priorities implies that a complete lack of progress would be acceptable. Perhaps there is a way for developing a metric for this entire group of recommendations.
8. In general, we perceive a relative inattention to issues affecting inland lakes in favor of the Great Lakes. There is, for example, no discussion of threats to and ways to protect high quality inland lakes. The Strategy would benefit from some additional attention to these issues.

Thoughts on Motivation

The Strategy identifies the need for new and evolving governance models as described, for example, in the discussion of the Natural Resources Working Group (18) and the work of the Department of Environmental Quality Environmental Advisory Council and MSU Natural Resources Governance Fellows Program (52). Likewise, the Strategy recognizes that "critical elements" of the Strategy must be "adopted and deeply engrained" into a variety of involved parties for the Strategy to be ultimately successful (54).

Yet the Strategy is somewhat short on discussing how this transformation is to occur, calling for only integrating relevant concepts into educational curriculum and increasing volunteer opportunities (56 - 57). Unfortunately, the former has been repeatedly recommended for both environmental and other social concerns with, given the demands on educational curriculum generally, little success. And given IWR's own experiences with regulatory impediments to volunteer activities (crowd-sourcing collection of water levels), the latter is easier said than done.

The government has traditionally approached motivation of individual behavior through incentives (primarily financial) and disincentives (primarily regulatory sanctions). The IWR believes that the Strategy provides an excellent opportunity to explore broader and more nuanced perspectives in at least three contexts:

1. Governance: How can Michigan encourage and nurture the multi-interest collaborative governance model described in the Strategy?
2. Involvement: How can Michigan recruit and motivate the contributions of the wide array of necessary actors and institutions identified in the Strategy?
3. De minimis impacts: How can Michigan effectively sensitize actors that the discreet impacts of their individual activities are cumulatively significant and, therefore, need to be meaningfully addressed?

This is a relatively new frontier for government recognition much less understanding and effective response. And, of course, the opportunity is not government's alone. The Strategy could be characterized as truly visionary if it explored deeper into this frontier than it currently does.

Comments on Specific Details

1. There does not appear to be a corresponding recommendation for the discussion of increasing holistic watershed based approaches to improving hydrology (11).
2. The discussion of harmful algal blooms (12 - 13) should be expanded.
3. Assuming the specific pollutants named in the second paragraph on page 20 are examples, not the definitive listing, "i.e." should be "e.g".
4. The IWR supports the recommendation to adopt a uniform statewide sanitary code (22-23).
5. There should be a recognition of the role of responsible parties to address legacy contamination and recommendations to assist government in holding those parties accountable for that responsibility (23).
6. It is not clear what is meant by the sentence: "*Prioritize investments around strategic economic assets of commercial harbors and long-term sustainable infrastructure*" (29).
7. It would be instructive to know the status of implementation of the 2008 Mercury Strategy (32).
8. The basis of the specified goals for water access should be described lest those goals be perceived as arbitrary (33).
9. One alternative to the time-consuming effort of "designating" water trails (33) would be to simply ensure information about any particular trail is available so that users can make choices about their needs.
10. It is not clear why voluntary efficiency targets are only recommended for agriculture in areas of existing or potential water stress (39).

Implementation Plan Comments

Goal 1

1. Item 11 (59) calls for addressing dams most at risk of failure by 2020. Has this list been developed? If so, where is it available? If not, will one be developed and available for public comment?
2. Some metrics are inadequate in that they provide no indication of magnitude. For example, see Items 14 ("increase"), 15 ("better accommodate"), and 16 ("increase") (60). In each instance, a single occurrence would technically satisfy this metric. This is either very unambitious or simple hesitancy to commit. Either case provides little assurance that much progress will be made.
3. The IWR supports development of priority watersheds (60), but recommends a more ambitious date than 2018 (60).
4. Item 18 references "escalated 'additional actions'" should a priority watershed fail to improve (60). But there is no discussion of this concept or approach in the Strategy itself.

Goal 2

1. There does not appear to be an implementation metric for "ensur[ing that] remediation activities address the long term impact of drinking water sources" (61).
2. "Convening" a stakeholder group to develop draft legislation on regulating geothermal construction should be extended to achieving passage of legislation thus developed (62).

Goal 4

1. There is no date for increases in public access (64).

Goal 5

1. The IWR supports the structure of the metric for agriculture water efficiency but recommends it be applied more broadly than areas of existing or potential water stress (66).
2. The IWR supports the concept of reduction targets for water use, but recommends that "Water Use Sectors" be spelled out to signify accountability and leadership opportunities within those sectors. These would include Industrial Manufacturers, Business, Municipalities and NGOs; as well as their industry professional associations. Another stakeholder which may need to be mentioned here and in other Goals would be the risk management industry, such as private insurance agencies, since for businesses best water management is about risk management and sustainability (65).

Goal 6

1. The IWR supports the development of a communications plan on water infrastructure by 2017 (66).
2. As described above a much more ambitious approach to funding the Strategy is imperative. With so much of the Strategy depending on funding, 2020 is simply not timely (67).

Goal 8

1. The IWR supports creating a Water Fellows Program by 2016 (68).
2. The IWR supports efforts to review the Drain Code but recommends completion by 2017 (68).
3. The IWR supports the metrics for the interdepartmental water team (68).

Goal 9

1. Although the IWR believes it is not a sufficient step (see Thoughts on Motivation above), we do support the development of a strategy for integrating fresh water literacy principles into education standards by 2016 (69).

Thank you again for the opportunity to comment on this important document. We look forward to your response to our comments and the final Strategy.

Sincerely,



Dr. Jon Bartholic,
Director

From: [Paul Beach](#)
To: [mi-waterstrategy](#)
Subject: water
Date: Thursday, August 27, 2015 1:36:18 PM

Dear Panel Members; I think that you have not given the Drain Code the attention it deserves regarding environmental impacts, surface water quality, and citizen participation in water matters. A comparison of our drain code with others, especially those of Minn., Wisc. and Ontario would be very instructive as would a reading of the 1980 Special Task Force Report on Drains. I hope that your effort meets a kinder fate. I think that you will receive significant resistance from the MACDC and its hundreds of associate members and its numerous devoted friends in our legislature.

Respectfully, Paul Beach



From: Sally Petrella
To: mi-waterstrategy
Subject: Re: my comments on the Water Strategy
Date: Thursday, August 27, 2015 2:46:47 PM
Attachments: [Water Strategy comments - Sally Petrella.docx](#)

Attached are my comments on the Michigan Water Strategy. Please ignore the last email I sent with no attachment.
Thank you for the opportunity to review it.
-Sally

On Thu, Aug 27, 2015 at 1:08 PM, Sally Petrella <spetrella@therouge.org> wrote:

Hi-

I reviewed the Michigan Water Strategy from my perspective as the Volunteer Monitoring Program Manager at Friends of the Rouge. Here are my comments.

P. 6-7 Recommendations and Measures of Success

--

Sally Petrella
Volunteer Monitoring Program Manager
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--

Sally Petrella
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www.therouge.org

Hi-

I reviewed the Michigan Water Strategy from my perspective as the Volunteer Monitoring Program Manager at Friends of the Rouge. Thank you for the opportunity. Here are my comments.

P. 6-7 Recommendations and Measures of Success

Goal 1 – If “Reduction in annual volumes of untreated sewage discharges” is a measure, there should be a corresponding Key Recommendation that states:

- Support the funding necessary to address the remaining CSOs in the state

Goal 3 – Outcome: Economic and community development plans and efforts fully leverage water assets to create great places to live, work and play **while protecting the ecosystem.**

Goal 4 – Need a corresponding Recommendation for “90% of the population has convenient access to swimmable and fishable water” AND realistically, boatable is more possible than swimmable since the urban watersheds where most of the population lives are nowhere near swimmable.

- Fund the research and projects necessary to reduce E. coli in waterbodies.

p. 13 Recommendations

- Support research to develop a comprehensive understanding of the cause of HABs in Michigan’s waters (this is mentioned as the biggest challenge to the recommendations should address this)

p. 14 Recommendations

- Encourage planning across municipal boundaries, sharing of information and services

p. 15 Recommendations – add to

- “Remove or improve dams that are no longer safe or ecologically, economically or socially viable to protect public safety and create healthy connected aquatic systems” **while avoiding opening dams that will invite invasive species movement upstream.**

p. 17 Recommendations - add

- Support research to assess the effectiveness of green infrastructure and require grant-funded projects to use the same measure of success so that projects can be evaluated and compared.

p. 18 Recommendations

- Fully fund measures that combine conservation and farmland preservation
- Prohibit farms from releasing runoff from manure and discourage concentrated animal housing.

p. 31 Recommendation

- Address untreated CSOs and fund solutions.

p. 32 Recommendation

- Address site specific legacy issues

p.33 Recommendation

Define public access and address concerns about fragile environments, problems with aggressive use of water resources, etc.

Designate Water Trails – recommendation

- Provide support for agencies developing water trails

p.36 Recommendations

add to end- with an emphasis on business that improves water quality and does not harm it.

p. 38 last paragraph

Aquaculture especially in the Great Lakes will impair the lakes, increase phosphorous and potentially spread disease to native fish populations. The Great Lakes are held in the public trust and should not be used for private aquaculture. Aquaculture contributes to the phosphorous problem.

p.45 Recommendations

- “Establish sustainable funding mechanisms to achieve Water Strategy goals including infrastructure management **especially for CSOs.**

p. 48 second to last paragraph

add: Monitoring is being conducted by many organizations using volunteers and maintaining high data quality standards, especially those being certified through MiCorps. The data is very useful to state agencies and these programs need to be supported and continue.

p. 49 Recommendation

add – and integrate volunteer monitoring data

four goals – make five goals and add

- Continue to support MiCorps and groups collecting useful data and integrate data into models

p. 54 Recommendation

add – Make sure state departments work together i.e. AOCs and stormwater management

p. 58

Recommendations 4-6 all need to address CSOs

p. 59 11 “Remove or improve dams that are no longer safe or ecologically, economically or socially viable to protect public safety and create healthy, connected aquatic systems **without encouraging the upstream movement of invasive species.**

p. 60

14 – add - the development of an evaluation tool for green infrastructure

15 – add- and encourage green infrastructure

p. 65 1 Recommendation – add for business that improves or does not impair water quality
Implementation Metric – Ensure any aquaculture does not damage waterbodies.

p. 67 Goal 7 1 Implementation metric – add and includes volunteer monitoring data

From: [Patty Troy](#)
To: [ml-waterstrategy](#)
Subject: Michigan Water Strategy draft -- suggested revisions
Date: Thursday, August 27, 2015 3:02:16 PM

On behalf of Mr. Clatworthy, I submit the following comments:

From: JulieJim [REDACTED]
Sent: Tuesday, August 18, 2015 2:01 PM
To: Karen Tommasulo
Cc: Patty Troy; Eschenburg, Lori; Kristen Lyons; Donna Strang
Subject: Michigan Water Strategy draft -- suggested revisions

My name is F. James Clatworthy and I serve on the St. Clair River Bi-National Public Advisory Committee.

I have two suggested revisions for the Michigan Water Strategy draft document:

1.) Goal 1, p. 11 "Prevent Introduction of and Manage Aquatic Invasive Species" second paragraph the devastating effects of sea lamprey communities ---- insert before sea lamprey **rainbow smelt and**

Rationale: The DNR needs to recognize they were responsible for the accidental release in 1912 and then intentional releases in 1919 and mid-1920's of our "voracious fish of prey" [Ryck Lydecker, Feb. 10, 1973, University of Wisconsin Sea Grant Project] Little Ozzie, or *Osmerus Mordax*. Smelt spawn in the spring and Lake Trout spawn in the fall so as the smelt population expanded the Lake Trout population started to decline even before the arrival of the sea lamprey in the 30's. And when the lamprey applications started to reduce lamprey populations the Lake Trout population continued to decline. The most notable example for Lake Trout population increase was after the smelt die off of 1947-49. Improved populations of Whitefish and Walleye were also apparent after the die off.

A good source for the pro and con for the destructive nature of the Rainbow Smelt can be found in Clifford R. Gerhart's book, Pity The Poor Fish Then Man, 1987, ISBN 0-932212-52-2.

2.) Goal 8 p. 22 " Develop a Spill and Communication Strategy" Edit this line to read: Develop a Spill Prevention Strategy and in case of a Spill then a Communication Strategy.

Rationale: It is one thing to have a spill or leak strategy, but **why not have a prevention strategy?** The two 20 inch pipes across the Straights of Mackinac carrying twenty million gallons of light crude (do we know for sure) in pipes that are 63 years old is a disaster waiting to happen. *Must the State wait until the pipes leak before it has a strategy?* The State needs to be PRO ACTIVE when it comes to protecting the Great Lakes and the connecting channels. The St. Clair River has numerous pipes crossing the river that have the potential to leak.

The State needs to act with all do diligence to prevent leaks from oil and chemical pipes under the Straights of Mackinac and the St.Clair and Detroit Rivers. All pipes crossing any portion of the Great Lakes or connecting Channels must be required to have automatic closing valves in response to pressure drops. Whenever possible, pipes should be routed through abandoned tunnels[St. Clair River] and under bridges[Mackinac Bridge] and placed within a larger pipe like the Alaskan Pipe Line in the Artic.

From: [Petrovskis, Erik](#)
To: [mi-waterstrategy](#)
Subject: Meijer comments
Date: Thursday, August 27, 2015 3:51:43 PM

Meijer appreciates the opportunity to provide comment on the MDEQ draft water strategy. The strategy is comprehensive and supports the 30-year vision for high quality water resources for the state. Meijer is especially supportive of establishing voluntary water efficiency targets and water conservation and reuse strategies. Meijer would like to see how these MDEQ recommendations can be translated into action items for local units of government who set requirements that conflict with these goals. For example, landscaping requirements and associated irrigation add to water and energy waste.



Erik A. Petrovskis, PhD, PE | Director of Environmental Compliance and Sustainability | Properties

Meijer | 127-06 | 2350 3 Mile Rd. NW | Grand Rapids, MI 49544

P: 616-735-7101 | C: 616-710-2228

Erik.Petrovskis@meijer.com

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From: [Laura Bretheim](#)
To: [mi-waterstrategy](#)
Cc: [David Ullrich](#); [Simon Belisle](#)
Subject: Water Strategy Comments - Great Lakes and St. Lawrence Cities Initiative
Date: Thursday, August 27, 2015 3:58:33 PM
Attachments: [MI Water Strategy Comments_GLSLCI_final.pdf](#)

Dear Michigan Department of Environment Quality Staff,

Please see the attached comments on the Michigan Water Strategy from the Great Lakes and St. Lawrence Cities Initiative. The Cities Initiative welcomes the opportunity to comment on the draft Water Strategy, and we look forward to seeing progress on the protection and restoration of the Great Lakes in the State of Michigan as this strategy moves forward.

With questions or requests for further information, please contact Simon Belisle, Program Manager, at 312-201-4517 or simon.belisle@glslcities.org.

Thank you for your consideration,



David A. Ullrich, Executive Director
Great Lakes and St. Lawrence Cities
Initiative
20 North Wacker Drive, Suite 2700
Chicago, Illinois 60606
Phone: 312.201.4516
david.ullrich@glslcities.org
www.glslcities.org



August 25, 2015

Mr. Jon Allan, Director
Office of the Great Lakes for Michigan
P.O. Box 30473-7973
Lansing, MI 48909

Dear Mr. Allan,

The Great Lakes and St. Lawrence Cities Initiative (Cities Initiative) commends the State of Michigan and its Department of Environmental Quality (DEQ) for the creation of the Michigan Water Strategy. Recognizing the importance of water for Michigan, all of the Great Lakes and St. Lawrence Basin states, provinces and local governments will only raise awareness and lead to positive change. The Cities Initiative also welcomes the opportunity to comment on the draft version of the Water Strategy.

1. Impacts of Climate Change

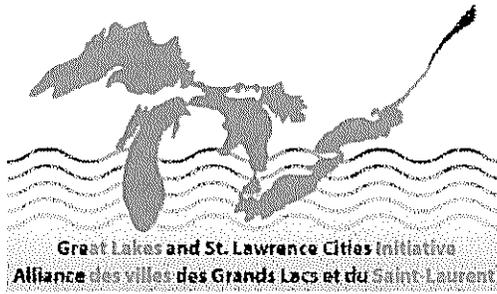
The Cities Initiative recommends that the Draft Water Strategy strengthen its position on the impacts of climate change by recognizing that all communities must be supported and equipped by the Water Strategy to adapt to and mitigate the effects of climate change. More frequent and more severe extreme weather events necessitate community-level strategic action plans that will ensure protection of local water resources and communities.

2. Leveraging Ongoing Efforts

The Draft Water Strategy touches on a myriad of elements related to water, showing how important and omnipresent water management is in our region, especially in a state bordered by 4 of the 5 Great Lakes. Many stakeholders mentioned as lead actors already have strategies, implementation plans and specific actions geared towards addressing issues mentioned in the Draft Water Strategy. In order to focus on implementation and respect the deadlines put forward in the Draft Water Strategy, it is important that it can be made flexible enough to leverage and incorporate the work already being done. It will also ensure that the Draft Water Strategy does not become a burden, but more of an umbrella planning document leading to positive action. The Cities Initiative particularly recognizes the Draft Water Strategy's focus on holistic public education; the strategy illustrates that water management involves environmental, economic, social, and cultural thinking, and the Cities Initiative encourages the continued use of this approach to water literacy in public education settings. This strategy can establish an informed citizen base, which may lead to increased support for future projects, good water management practices that start in the home, and sustainable and collaborative relationships among stakeholders.

3. Funding of Strategy Actions

The Draft Water Strategy identifies correctly the need for investment in multiple aspects of water management. In order to ensure the implementation of all the initiatives mentioned, it will be important that a funding mechanism be in place to make sure no specific government level is unfairly responsible for infrastructure funding. A commitment to fair funding would be a welcome addition to the Draft Water Strategy. This funding strategy, combined with an emphasis on public education, would allow communities to work with citizens who are informed about water use and water quality issues while ensuring that adequate funding is available for infrastructure improvements as well as for continued public education efforts.



Finally, the Cities Initiative would like to acknowledge the inclusion of several key items: first, a commitment to a 40% reduction of phosphorus in Lake Erie by 2025; second, a commitment to ban microbeads at the state level; and third, the overall support and inclusion of Low Impact Development and Green Infrastructure projects. These three items support ongoing work throughout the Great Lakes Basin and ensure a sustainable future for many citizens of the region. We are glad that the State of Michigan is stepping forward as a committed leader in these areas, and we hope that it will consider adding to the Strategy based on our recommendations above.

With questions or requests for further information, please contact Simon Belisle, Program Manager, at 312-201-4517 or simon.belisle@glslcities.org.

Thank you for your consideration,

David A. Ullrich, Executive Director
Great Lakes and St. Lawrence Cities Initiative
20 North Wacker Drive, Suite 2700
Chicago, Illinois 60606
Phone: 312.201.4516
david.ullrich@glslcities.org
www.glslcities.org

From: [Roger Labine](mailto:Roger.Labine)
To: mi-waterstrategy
Subject: FW: My Remarks to the Water Strategy
Date: Thursday, August 27, 2015 4:04:58 PM
Attachments: [Comments On Sustaining Mich water 30 yr plan \(draft\).docx](#)

From: Roger Labine [mailto:roger.labine@lvdtribal.com]
Sent: Thursday, August 27, 2015 1:39 PM
To: 'Office of the Great Lakes' <Mi-waterstrategy@michigan.gov>
Cc: 'Roger LaBine' [redacted]
Subject: My Remarks to the Water Strategy

Good Afternoon,

Please find attached the remarks to the Water Strategy. I have noted the top six concerns I have with the draft. I'm willing to share the remaining concerns and issues at another time, during a planning session or when the departments are consulting with the Lac Vieux Desert Band of Lake Superior Chippewa.

Please feel free to respond if you any questions regarding my comments

Roger LaBine
Water Resource Technician
Environmental and Planning
Lake Superior Band of Lake Superior Chippewa
Office: 906.358.4577 ext. 4122
Fax: 906.358.4785

Comments On:
Michigan Office of Great Lakes'
Sustaining Michigan's Water (30 year plan)

I am drafting these remarks as the Water Resource Technician in the Environmental and Planning department for the Lac Vieux Desert Band of Chippewa (LVD). These comments shall not be considered as consultation with LVD, and may not be considered as the opinion of the LVD Tribal Council.

- Tribal consultation and collaboration with LVD needs to be addressed, and maybe the other federally recognized tribes. Being employed in my current position for more than three years, I had little to no knowledge until a MTEG meeting in June when the draft was available for previewing, the State of Michigan was preparing this position document. Development of Government-to-Government relationships is vital to the planning and implementation of action to restore, preserve, and protect the aquatic ecosystems the tribal nations honor, respect, and are dependent on for their way of life.
- *Table 2 Goal 1#1:* Consider adding a review, re-evaluation and revision of the Aquatic Resource list as it pertains to threatened and endangered species. Specifically, the status of wild rice (all species) in the state of Michigan. This resource was one present throughout the state (i.e. Tawas and Houghton Lakes). The LVD tribe has encountered many hardships with their Wild Rice Restoration project which was started in the late 1980's, and recently the other tribes in Michigan have initiated Wild Rice Restoration projects. The project has remained a priority project and the successful restored sites are in dire need of minimal protection and enforcement. *Under the Implementation Metric:* by 2020, the ecological separation of the Great Lakes Basin from the Mississippi River Basin is a concern. A portion of the LVD properties, and an initial site of the Wild Rice Restoration project is in the headwaters of the Wisconsin River watershed which is part of the Mississippi Basin. Additionally, the tribe in partnership with other stakeholders are jointly addressing both aquatic and terrestrial

invasive species and the decline of walleye populations in Lake Lac Vieux Desert.

- *Table 2 Goal 1#3:* Could the research and solutions consider seeking answers to the reemergence of Wild Rice beds in Saginaw Bay? This could assist with the answers to its original disappearance for several decades.
- *Table 2 Goal 1#5:* Consider measures to reduce phosphorus levels in all waters which have the designation of being impaired, or put them at risk of producing HAB's. With the exploration of potential mining in the western part of the Upper Peninsula, consider setting sulfate levels in water and setting sulfite levels in the sediment. This would be a proactive approach to preserving the established rice beds which are currently in jeopardy for various other reasons.
- *Table 2 Goal 1#11:* The tribe is currently working with the stakeholder in the turning over of a repaired dam, to reestablish a previous wild rice bed which may have sustained damage with the lowering of the flooding to do the repairs. Other stakeholders have offered support for the restoration/enhancement of the wild rice bed. This could be done at other sites.
- *Table 2 Goal 2#4:* There should be more preventative measures regarding chemical and oil disasters, more oversight and inspections on infrastructure which are exceeding its life expectancy (i.e. line 5 under the bridge). It's an excellent idea to do emergency planning and preparation in the absence of the ability to demand upgrading and maintenance on the aging infrastructure. Many current and ongoing practices need to be addressed as they are identified as the threat clean water.

Overall, this is a great start to bring awareness to the fact our water is in need of healing. The LVD tribe has been in the process of developing relationships with stakeholders to implement many of the recommendations within the document.

These are the immediate concerns or thought I have, by no means complete.

Roger LaBine

Water Resource Technician

Lac Vieux Desert Band of Lake Superior Chippewa

From: [McElhinney, Cary](#)
To: [mi-waterstrategy](#)
Subject: Water Strategy Comments
Date: Thursday, August 27, 2015 6:11:20 PM

- The Michigan DEQ and other applicable organizations, water utilities, etc. should consider leveraging the USEPA WaterSense program by becoming voluntary partners with WaterSense and utilizing the resources and consistent messaging WaterSense has to offer for robust water conservation and efficiency programs: <http://www.epa.gov/watersense/>
- Be sure to explore supply-side water efficiency in municipal water and not just demand reduction. Water loss control and other non-revenue water programs can enhance utility supply concerns as well as revenue issues.

Cary McElhinney
WaterSense Coordinator



From: [REDACTED]
To: [mi-waterstrategy](#)
Date: Thursday, August 27, 2015 6:52:55 PM

This action to begin taxing water that comes from private wells is unconstitutional. The state does not own to the center of the earth. Putting this tax onto peoples property tax bills without any vote is wrong. Where does it stop. How soon will we be taxed for breathing the air over our property. This is bad and should be scrapped. The DEQ is powerm hungry and needs to be reigned in by the legislature. this smacks of AGENDA 21.

Sent from Windows Mail

From: [Molly Flanagan](#)
To: [mi-waterstrategy](#)
Subject: Comments on Michigan's Draft Water Strategy
Date: Thursday, August 27, 2015 10:33:13 PM
Attachments: [Michigan Water Strategy Alliance and NWF Final.docx](#)

Attached please find comments from the Alliance for the Great Lakes and National Wildlife Federation on Michigan's Draft Water Strategy. Thank you for the opportunity to submit these comments. We appreciate your consideration.

Best,
Molly

Molly M. Flanagan | Vice President, Policy | mflanagan@greatlakes.org
Alliance for the Great Lakes | www.greatlakes.org
150 N. Michigan Avenue, Suite 700 | Chicago, IL 60601 | 312.445.9741

Protect Your Lakes at <http://takeaction.greatlakes.org/subscribe>





ALLIANCE FOR THE GREAT LAKES
ENSURING A LIVING RESOURCE FOR ALL GENERATIONS



VIA EMAIL to: Mi-waterstrategy@michigan.gov

August 28, 2015

Office of the Great Lakes - DEQ
P.O. Box 30473-7973,
Lansing, Michigan 48909

RE: Comments on Michigan's Draft Water Strategy

Dear Director Allan:

These are comments of the Alliance for the Great Lakes (Alliance) and National Wildlife Federation (NWF). The Alliance's mission is to conserve and restore the world's largest freshwater resource using policy, education, and local efforts, ensuring a healthy Great Lakes and clean water for generations of people and wildlife. The Alliance is a regional organization that has offices in Grand Haven and Detroit, Michigan. NWF is a national organization with its Great Lakes Regional Center located in Ann Arbor, Michigan. NWF's mission is to inspire Americans to protect wildlife for our children's future.

We are pleased that Michigan is focusing on cultural and social relevance of the Great Lakes as a necessary component for long-term ecological health. The draft Michigan Water Strategy is a great step forward which could be strengthened with additional clarity on exactly what agency will implement its recommendations and how progress will be measured and tracked. We hope that these suggestions will help to strengthen the Strategy. Marc Smith, policy director with NWF, serves on the Water Cabinet that helped develop this strategy. Khalil Ligon, Alliance's Southeast Michigan Outreach Coordinator, played an important role in gathering public input from Detroiters. We appreciate the time and commitment by the Office of the Great Lakes in working with a vast and diverse set of stakeholders to shape a common vision for Michigan's water resources. We look forward to working with the state on implementing this strategy.

We believe that the draft strategy should be significantly strengthened with additional clarity on several areas as described below. One general observation is that the importance of maintaining existing

programs in addressing ongoing water concerns should be highlighted. For example, key programs such as the Clean Water State Revolving Fund and the Drinking Water Revolving Fund are briefly discussed in Appendix 3, but are largely not addressed in the main text of the Strategy, except in the context of the enterprise budget. These and similar programs (such as the federal Clean Water Act Section 319 program) should be specifically highlighted in relevant sections addressing water infrastructure or water quality impairments. Similarly, federal Farm Bill programs are only briefly discussed in the Strategy, yet new programs such as the Regional Conservation Partnership Program offer potential to lead to significant local and regional water quality improvements, and the Strategy should reference these programs.

Our more specific comments on the draft Strategy are organized based on the proposed goals, as follows:

Goal 1: Michigan's aquatic ecosystems are healthy and functional.

1. **Invasive species:** Michigan's leadership and efforts to reduce the threat from invasive species is commendable. We are pleased that the draft water strategy continues this high level of commitment. We also appreciate Governor Snyder's commitment to address the invasive species threat from the Chicago Area Waterways System and ask that Governor Snyder use his influence to urge Illinois to engage in finding a long-term solution to this problem. In addition, Michigan should engage with regional partners on all aspects of invasive species management, including early detection and rapid response, risk assessment (in identifying potential new invaders of concern), control and management programs, and public education and outreach.
2. **Algal blooms & phosphorus reduction:** We are very pleased by Michigan's commitment to reduce phosphorus entering the western Lake Erie basin by 40% by 2025. This paradigm-changing commitment is an extremely important first step that follows the scientific consensus that 40% reductions in phosphorus will significantly reduce the prevalence and impact of harmful algal blooms in the basin. Of course, commitments are only valuable to the point that they are implemented. To achieve the proposed 40% reduction of phosphorus entering Lake Erie, Michigan should complete a draft Implementation Plan quickly and provide for public comment with public hearings in key communities within the western Lake Erie basin. After considering public comment, the plan should be finalized and implemented. In order to effectively achieve the goal of reducing phosphorus entering western Lake Erie by 40% and improve Lake Erie's water quality, as well as demonstrate progress, we urge Michigan to:
 - a. Set up a process to identify sources of phosphorus and nitrogen including locations, causes and amounts to the greatest extent possible using the best available science. In addition to the known point sources, this effort should differentiate between specific sources such as chemical fertilizers, livestock waste, biosolids, combined sewer overflows, and home septic systems.
 - b. Note in the Strategy that the implementation plan will include reference to important existing programs (such as the ongoing Michigan Agriculture Environmental Assurance Program, Farm Bill programs, and urban infrastructure programs), and should identify

interim objectives and deadlines for reaching them. In addition, the Strategy should reference broader ongoing efforts, such as the Great Lakes Commission-led Lake Erie Nutrient Targets Workgroup, and development and implementation of efforts through the Great Lakes Water Quality Agreement Annex 4 process. Furthermore, the implementation plan should mention key watershed approaches to meeting water quality standards, including the total maximum daily load (TMDL) provision of the Clean Water Act, which is not referenced anywhere in the draft Strategy, but which can be a key tool in reducing nutrient loads to impaired waters.

- c. Build on existing monitoring work to develop and implement a measurable, reportable and verifiable water quality monitoring system with continuous sampling stations in locations that will provide data for the whole western Lake Erie basin watershed that can be used to determine whether reduction in phosphorus are being achieved. The state should coordinate with federal agencies (e.g. U.S. Geological Survey, U.S. Environmental Protection Agency (USEPA), National Oceanic and Atmospheric Administration (NOAA)), appropriate state agencies (both in Michigan and other Lake Erie basin states), Canadian and Ontario agencies, local agencies, and others as appropriate in developing a comprehensive monitoring system, both in the watershed and in the Lake. This would include monitoring for nutrients, selected harmful algal bloom species and toxins, and temperature and other key ancillary parameters.
 - d. Report publicly on progress made under the implementation plan on a yearly basis.
3. **Green infrastructure:** There are opportunities to address polluted runoff from cities and encourage the inclusion of green infrastructure targets in measures of success. An example would be to increase mandatory minimums allotted for the green infrastructure in transportation projects. Transportation projects are often the biggest missed opportunities to install large scale, comprehensive green infrastructure. We suggest that Michigan incorporate water resource planning into placemaking efforts and develop a sustainability checklist to guide land-based planning and development. In addition, we recommend modernizing road and highway planning and infrastructure to effectively manage stormwater runoff and infiltration needs on site, thereby reducing the costs and impacts of flooding. In add, due to the significance of urban sources of pollution to surface waters, in particular in southeast Michigan, the state should expand partnerships with Detroit and nearby communities to further advance green infrastructure solutions to ongoing problems associated with combined sewer overflows and other wastewater issues.

Goal 2 – Michigan’s water resources are clean and safe.

1. For the first key recommendation to protect from oil spills, Michigan should follow Alaska’s and California’s example and increase the state’s financial responsibility requirements for vessels carrying oil across the Great Lakes. Increasing these requirements will help to ensure adequate funds for clean-up and remediation in the event of an oil spill. We welcome the

recommendations of the Petroleum Task Force to improve the safety of oil pipelines, as well as those to increase transparency and accountability. However, Michigan must act swiftly to implement the recommendations if they are to be meaningful and actually protect against oil spills. The oil transportation industry has set its sights on the Great Lakes to increase capacity to move heavy crude oil to Midwestern refineries. The state should also consider implementation of more specific recommendations made by NWF in our report *Sunken Hazard* (https://www.nwf.org/pdf/Great-Lakes/NWF_SunkenHazard.pdf), including development of a regulatory framework considering broader impacts of oil pipelines and spills, development of requirements for spill response plans and reporting, and restrictions on any new interstate pipelines and expansion plans.

2. For the third key recommendation to “Secure a long-term funding source to accelerate the cleanup of legacy contaminated sites,” we recommend that the recommendation encompass corporate responsibility. For example, Michigan might consider holding polluting industries accountable for historical and future contamination of Michigan water resources by imposing a surcharge at a level that incentivizes businesses to eliminate adverse practices and implement sustainable practices to protect the water resource.
3. The fourth key recommendation to “Establish priorities and address emerging pollutants of concern,” should include enacting a statewide ban on the sale and production of plastic microbeads (as is already stated on p. 25 of the draft Strategy).
4. We request that you insert the word “human” to the first measure of success: “100 percent of the human population has safe drinking water with no reported violations of health-based standards.” Inserting the word “human” reinforces the target for this measure of success and addresses equity issues around this goal.
5. We also request that you add the following text to the second measure of success: “No drinking water advisories, beach closures or aquatic life impairments due to harmful algal blooms [or any other existing or emerging pollutant of concern].” Furthermore, the state should move more aggressively in expanding water quality standards to include priority chemicals of emerging concern.

Goal 3: Michigan communities use water as a strategic asset for community and economic development.

1. We ask that the first key recommendation be revised to add the following text: “Leverage water resource assets at state, regional and local level to create sustainable economic opportunities [and ensure community benefit].”

2. To ensure the community benefits from its resources, the Strategy should include development of enhanced marketing plans for water-based recreation tourism (i.e. through Pure Michigan campaign), expansion of annual summits to include all public and elected officials, and development of a shared cost plan for infrastructure needs encouraging public-private partnerships.
3. This section should acknowledge and stress the importance of ensuring that waterfront areas are and will continue to be accessible to all to promote social equity.
4. The Strategy should include guidance that harbor planning should be included in land use planning efforts.

Goal 4 – Michigan’s water resources support quality natural resources, recreation and cultural opportunities.

1. We urge that key recommendation 2 (p. 8) be revised to add the following text: “Prioritize investments in recreational harbors [and shoreline restoration] to address long-term infrastructure needs.”
2. Key recommendation 3 should be expanded beyond the creation of water trails by adding the following text: “Develop and implement a water trails system [and market coastal recreational opportunities].” This will help foster a greater sense of connection to the community and water stewardship.
3. The measures of success should add the following “100% of the human population has convenient access to swimmable and fishable water.”
4. To protect water resources, Michigan should stress public responsibility and encourage behavioral modifications and lifestyle changes (e.g. eliminated microbead use, littering, plastic water bottle use and participating in curbside recycling programs). This can be done through a statewide “Go Green” campaign/program that incentivizes such activities. . In addition, the state should provide resources to smaller and/or poorer communities unable to implement their own recycling and related programs.
5. This goal supports “quality natural resources” and hunting and fishing, but the recommendations and measures of success do not adequately protect wildlife and threatened habitat or support wetland restoration. Given the significant contribution wetlands have in Michigan towards protecting and restoring our Great Lakes, inland waterways and providing critical wildlife habitat for ducks, geese and numerous other migratory birds and wildlife, we recommend adding a key recommendation advocating a net gain in wetlands, especially in those regions faced with a significant wetland losses. The strategy should support retaining Michigan DEQ’s assumption of Clean Water Act Section 404 jurisdiction (as is stated in Goal 8,

recommendation #4) and maintaining a strong state program on the conservation of Michigan wetlands, including with support through the Great Lakes Restoration Initiative, the North American Wetlands Conservation Act, and other programs designed to protect, restore, enhance and manage wetlands.

6. For recommendation #2 concerning mercury reduction activities (p. 64), the implementation metric should include a footnote providing more details. For example, it is not clear if the goal is that all fish vs. the median of samples vs. 90th percentile, etc. are to meet the target, Furthermore, the target concentration itself (0.35 ppm) is still above a concentration at which moderate- to high-consumption fish consumers would be ingesting mercury at levels sufficient to threaten health.

Goal 5 – Michigan has a strategic focus on water technology and innovation to grow sustainable water-based economies.

1. The Key recommendations should include establishing an on-site stormwater management standard for all land use developments.
2. Key recommendation 1 using the business led council must ensure that the public's perspective is represented at the table so that the council is not purely profit driven, to the exclusion of environmental, social and cultural values. Including community and environmental groups on the council could help achieve this goal.
3. Key recommendation 2 should be revised to require mandatory water efficiency targets.
4. Key recommendation 3 should be revised with the addition of the following text: "Develop water conservation and reuse strategy for the state [local governments, and private and public facilities] that incorporates the use of green infrastructure, grey water systems and energy production and includes recognition programs.

Goal 6-- Michigan invests in infrastructure and supports funding to maintain clean water and healthy aquatic ecosystems.

1. The state should explore water affordability plans to equally distribute the cost burden of water infrastructure, while not denying access to those who cannot afford it.
2. The state should provide training to educate the public in the conceptual statewide enterprise budget for stormwater, drinking water and wastewater.

Goal 7 - Michigan has integrated outcome-based monitoring systems that support critical water-based decisions.

1. Michigan's monitoring systems should expand opportunities to engage citizen volunteers and participation, such as the Michigan Clean Water Corp (MiCorps) program, in gathering water quality and quantity data, in restoration, in providing access and in maintenance of important water-related resources. The strategy should clearly define how this information will be used and shared and what agencies/entities will warehouse this data. To the extent that the effort does not duplicate existing provision of data through the MiCorps program, this could be a state managed website or dedicated online portal linked to the Pure Michigan campaign.

Goal 8 - Michigan has the governance tools to address water challenges and provide clean water and healthy aquatic ecosystems.

1. Governance structures and policies must be implemented to ensure the work of the Strategy transcends changes in administration.
2. The Measure of Success for this goal states: "By 2030, achieve a 40% reduction in number of designated uses or impaired waters." It is not clear why a reduction in designated uses would be considered a positive environmental outcome. Presumably this measure of success should be focused on reduction in the percentage of impaired waters (i.e., so that more waters are meeting water quality standards, including their designated uses).

Goal 9 – Michigan citizens are stewards of clean water and healthy aquatic ecosystems.

1. Key recommendation 1 should be revised with the addition of the following text: "Integrate water literacy [principles] into [place-based education and] State of Michigan curriculum standards [tied to Science, Technology, Engineering and Math (STEM) principles across all grade levels]"
2. Measures of success 1 should include increasing the number of people engaged in water stewardship activities.
3. In support of this Goal, we offer several specific suggestions:
 - arts should also be included;
 - sessions should be offered to elected official and decision makers to orient them to the strategy and its goals;
 - An outline of the process of ongoing engagement that organizations can expect with the Office of Great Lakes through the finalization and implementation of this Strategy is needed;
 - opportunities for youth engagement beyond K-12 education should be strengthened in the Strategy;
 - implementation of stewardship activities should be coordinated with existing and potential grassroots efforts;
 - efforts must address social and cultural gaps in access and affinity for water since people are more likely to engage in stewardship that has a direct relational connection to water resources; and

- ensure sustainable funding sources for community-based stewardship efforts.

Thank you for the opportunity to provide these comments. We appreciate your consideration and look forward to working with you to implement Michigan's Water Strategy.

Sincerely,

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